An abstract geometric design on a dark blue background. The design features a central rectangular box with a dark blue background and white text. This central box is surrounded by a complex arrangement of overlapping, irregular shapes in various colors including light green, pink, red, and brown. The entire composition is enclosed within a circular border with a jagged, sawtooth-like edge.

DEVELOPMENT  
AND  
USE OF PATENT  
CLASSIFICATION  
SYSTEMS

U.S. DEPARTMENT OF COMMERCE / Patent Office

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amid "Silent one" (p. 86)

W. E. HEATON  
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# DEVELOPMENT AND USE OF PATENT CLASSIFICATION SYSTEMS



U.S. DEPARTMENT OF COMMERCE

John T. Connor, Secretary

PATENT OFFICE

Edward J. Brenner, Commissioner

JANUARY 1966

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## *Foreword*

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An initial "Plan of Classification" was hurriedly drawn up in 1899 (expanded and published in booklet form in 1900) and revised in 1915. This 1915 booklet, "The Classification of Patents," served as a guideline until 1946 when a slightly modified second edition was issued. In 1949-50 two preliminary drafts of a more detailed treatment of classification guidelines were hectographed in loose leaf form. These last two publications were not distributed much beyond the confines of the Patent Office Classification Group and, as stated in each draft Introduction, did not supersede the 1946 booklet. Up to this point many of the guidelines were hallowed only in the breach. In January of 1964 a synthesis of all this previous material was issued under the title of MAPIT (Manual-Access Patent Information Technique).

Responsive, in part, to the internal and external feed-back generated by this limited measure of modification, a second edition—of which this foreword is part—has been prepared. This second edition, outwardly distinguished by a new title and increased size, while still only a guideline, is an authoritative guideline. It not only supersedes all the previous classification publications mentioned above, it also represents a determined effort to resolve the conflicts and contradictions all too evident in such prior publications. Wherever possible a preferred technique has been set forth. While not intended as an inflexible mandate, variance from any preferred guideline will be suspect, likely to be closely scrutinized—challenged—and thus is likely to require ample justification.

As of the date of publication of this work several classes or parts of classes are mechanized or under development into a mechanized system. This publication is not the proper forum for an exposition of any or all of the mechanistic techniques under study. One interested in this subject may consult the Appendix for a reference to publications of the Office of Research and Development of the U.S. Patent Office. Even assuming that the future (near or far) may see the introduction of more and more mechanical aids to searching patent documents, it should be clear that only by maintaining and improving a logically subdivided and ordered system for the more than eight million documents already involved can it be hoped that a conversion will be both economically and physically feasible.

This publication has been prepared by a committee of four: Ivan R. Lady, Joseph R. Leclair, Irving J. Rotkin, and Herbert S. Vincent. The committee was appointed by and under the supervision of George

A. Gorecki, Director of the Office of Patent Classification. Further suggestions for improving the form and content are always welcome. They should be addressed to:

Commissioner of Patents  
Attention:

Director, Office of Patent Classification  
U.S. Patent Office  
Washington, D.C. 20231

## *A Historical Preface to U.S. Patent Classification*

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Over the years the examination process carried on by the U.S. Patent Office has prompted many efforts in the arrangement of patent documents to facilitate the determination of novelty. Remnants of the many early efforts still constitute parts of the present U.S. Classification System. As a matter of fact, guidelines and techniques stated as improper and outmoded at the turn of this century are reflected in current classification systems created as late as the mid 1930's.

All recent work by the Patent Office in patent classification, treating only small segments of the 3 million patents at any one time, has had to be dovetailed into a larger existing mass of prior classification. Thus an understanding of the present patent classification systems, and the techniques found useful both in creating and using this classification, necessitates a study of prior patent classification systems and the rationale involved in their creation.

When Congress, in 1790, first established a patent examination system there was neither an available collection of prior patents—domestic or foreign—nor an accepted technique for making the required determination of novelty and utility. Fortunately, the task of administering the patent law gravitated quickly to Thomas Jefferson, then Secretary of State.

Jefferson's own legal and scientific background, coupled with his probable knowledge of earlier British and French patent practices, helped set a high initial standard. Using his own extensive library—arranged in accord with Lord Bacon's principals—as a search tool, Jefferson processed to issuance some 57 patents before the examination system was dropped in 1793.

This small number of patents did not necessitate any formal classification effort. Nor did the registration act of 1793—which replaced the prior examination system—spur any early classification effort on the part of the officials charged with its administration. All questions of novelty, utility, and scope of monopoly grant were left to the courts. Patents were not printed and only available to the public in manuscript form in the files of the State Department.

All early patent lists were solely chronological. In 1830 Congress authorized publication of a subject matter oriented patent list. Modifying a previously (1829) issued listing of 14 groups for models, a patent

list in 16 groups issued in 1831. These 16 groups followed no discernible order or pattern and subordinate titles were used under each group heading only to exemplify the grouping.

In 1836 Congress reinstituted an examination system for patents and established the Patent Office to administer the system. Within 6 months the entire office and its records were wiped out by fire. The combined impetus of the new patent system, the new agency, the devastating fire, and a known search field of 10,000 patents led to the promulgation in 1837 of a new patent list divided into 21 classes. This list reflected a continuance of the practice followed in 1831 of accommodating growth by adding groups, or classes, rather than by merely further subdividing existing classes. Class 21 was entitled "Miscellaneous." This listing—like its predecessor—had no discernable order, basis, or relationships among the classes listed.

The following year a modified listing of 22 classes was issued. "Miscellaneous" was now class 22 but the other changes had reduced the number of items in this group to 5 as compared to 20 in the previous listing. The 22 classes (fig. 1),\* except for Miscellaneous, were jointly alphabetically—by title—and numerically arranged. In addition to a very limited amount of cross-noting among classes—started the previous year—the new listing also displayed two instances of cross-noting within the same class. In Class 1, Agriculture, without citing a patent number, alphabetically placed titles "Cleaning" and "Mowing" carried the italicized notations of "see Winnowing" and "see Cutting", respectively, at which points in the listing the pertinent patents were listed.

Apparently only a limited number of class schedules were printed for use by "each clerk" but the same schedule was used in the published listing of all U.S. patents issued in 1839. This publication received wide circulation and it is reasonable to assume that copies gravitated to foreign patent offices.

Without significant changes, this schedule of 22 classes was used until 1868. There is no evidence of any further subdivision, either for purposes of search or record, though use of a common search room by both examiners and the public—relying upon original drawings and models—and the growing number of documents (10,000 in 1836 to 80,000 in 1868) indicated a real need for subdivisions. Photolithography of drawings begun after the Civil War was not completed until about 1878, while printing of specifications begun in earnest in 1866 was not completed until after World War I.

During this time French patents—printed as early as 1811—and British patents—printed from 1852 on—also became available for search purposes. Along with these foreign patents came their classifications. The first French listing, printed in 1843, was no better than the earlier

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\*All the Figures for this Preface are collected in Appendix V at the end of the publication.

U.S. listing prior to 1830—a simple alphabetical index of each patent title. The first British listing followed a comprehensive overhaul of the entire British patent system in 1852.

In 1854 the British Patent Office published an index for all specifications enrolled from 1617 to 1852. This index included chronological, alphabetical, and subject-matter lists for these 14,359 specifications. By 1856 a similar index for each year was being issued to keep the records current. These indexes included a “Key of Terms and Phrases in Titles and etc.” keyed to the patent list arranged by subject matter and a “Synopsis” or alphabetic listing of the subject matter headings. Though made from patent titles only, the index was thorough. (The requirement in Britain for descriptive titles was very rigorously enforced.) The “Key”, well over 1,500 items, was frequently cross-noted.

The “Synopsis” (2d edition, published in 1857, cited in fig. 2) some 11 pages long, listed about 250 subject matter headings and included a great many instances of primary and secondary subdivisions within or under each major heading. This great development of a search tool in Britain was the more remarkable in that the examination contemplated by the act of 1852 did not take place.

In 1856 the French Patent Office published an index to patents issued between 1844 and 1851. This index, an alphabetically ordered listing of 80 classes was again no more than an expansion of what had been done in the United States in 1837. There were no subdivisions within the classes. In 1861 France adopted a new classification system consisting of 20 classes, with several subdivisions each, and a class for miscellaneous. From this point on French classification was limited to expansion by further subdivision only. Except for keeping a miscellaneous class concept alive it is not believed to have affected the development of the U.S. classification system.

In 1868 the United States issued a booklet on “Classification of Subjects of Invention.” This new classification increased the number of classes from 22 to 26, dropped the miscellaneous grouping, provided for primary and secondary subdivisions within many classes, and adopted a roman numeral designation for the classes—arabic numeral designation for primary “sections” and capital letter designation for “subsections.” As in the British classification of 1854, which provided third order subdivisions, this classification of 1868 included several “sec” notations. Each section and subsection included an alphabetical list of items encompassed by the class title and class title subscript. The classes were also alphabetically arranged and as before bore no other relationship to each other. The latter part of the 1868 booklet was taken up with an “Alphabetic Index of Inventions.” This was not much more than a broad title of invention index—each title keyed to but one class or class and subdivision.

While the U.S. classification of 1868 was about on equal footing with the British of 1854, although the United States had by then ceased pub-

lishing lists of patents according to a subject matter index, a noticeable distinction seems apparent from the pertinent remarks of U.S. Commissioner Theaker in his annual report for the year 1867:

"The purpose of the change in classification . . . has been . . . to allot more systematically the floating cases . . . . A division became a necessity to secure a proper apportionment of work among the corps of examiners."

Evidently the emphasis and primary concern was in the area of administrative problems.

Parallel language at the same time in British reports, despite their adherence to a registration system, indicates a greater emphasis on the use of classification as a search tool. By this date (1866) a British applicant was required to furnish an abridgment of his specification which abridgments were subsequently published in class groupings. Some 29 classes were published by 1868, some in two parts, and 16 classes more were in preparation as well as 12 second parts for existing classes also under way.

The 1868 U.S. Patent Classification System was superseded in 1872 by a similar, but expanded publication. There were now 145 classes and significantly more notes and subdivisions. Some 132 pages of the booklet were devoted to an "Alphabetical Index of Inventions." The establishment of these 145 classes in 1872 created the framework upon which the present U.S. system was built. While similar to the 1868 version, the greatly expanded number of classes provided a much more useful tool to the patent searcher.

The influence of the 1872 classes (fig. 3) is very obvious in the class titles today. This is particularly so since there has never been another complete, one-shot, revision made. All subsequent changes consisted of either intraclass changes, the addition of new classes (by splitting of or cutting from existing classes) or abolition of classes (by amalgamation with existing or new class or shift of number and title). For example, a comparison of the first 145 class titles now used clearly shows that the overwhelming number are directly descended from the 1872 schedule.

Though several classes were divided into two or more parts, there were no designated subclasses for the 1872 classification system. Each class did have associated with it an alphabetical list illustrative of the sort of subject matter encompassed. Not until 1880 was a schedule issued with numbered subclasses for most of the 164 classes. When they appeared these subclasses were generally in alphabetical order by title, which title was limited to a word or two. There were no cross-notes of any kind in the 1880 schedule.

Starting with the 1882 schedule of some 167 classes, rudimentary cross-noting was reintroduced and Class 36, Electricity, was accompanied by two pages of "explanatory notes" for the subclasses thereof (fig. 4).

This gradual growth of subclasses and "explanatory notes" continued through several subsequent publications until 1895 when all the notes developed up to that time were dropped.

By 1897 there were 215 classes, almost all of which were subdivided into alphabetically ordered subclasses (as few as 5 to over 200 in some instances) with no cross-notes or other guides except an alphabetical index for all subclass titles keyed to a proper class title.

Meanwhile the British, in 1877, had begun the establishment of a special indexing staff and continued to add to the number of classified abridgments every year. While Congress refused to authorize a similar classified abridgment series, Commissioner Leggett encouraged individual examiners to publish several collections of patent digests: "Sewing Machine Attachments" in 1872, "Breech Loading and Magazine Small Arms" in 1874, "Cotton Bale Ties" in 1877, etc.

These digests, which continued to issue sporadically for many years, were often arrayed according to rather sophisticated classification schemes as compared to the corresponding Patent Office class schedule. For example, it wasn't until 1893 that Class 42, Firearms, incorporated the details of the 1874 digest into its subclass schedule. It should also be noted that "Knight's Mechanical Dictionary," which first issued in 1872, included the digest schedule for small arms in its 1882 edition. Knight also included several other such abridgment or digest schedules which were never reflected in the Patent Office Classification Systems.

At the turn of the century, 1898, Congress—responding to a mounting clamor echoed in most reports of patent commissioners for over 50 years—authorized and directed the employment of a special force "to revise and perfect the classification by subject matter, of all letters patent and publications . . . which constitute the field of search . . .". Starting with some herculean labor by an untrained staff, the classes existing in 1898 were individually revised and modified—over a period spanning 65 years—into general agreement with a continually developing plan according to written guidelines and detailed class and subclass title definitions and notes. At present (1965) there is only one class still undefined and in the form in which it existed back in 1898. In addition to revising and modifying previously existing classes, many new classes were created during this period.

Despite the fact that all but one of the present classes have been "reclassified" a precautionary note is very much in place at this time. Every class schedule and the associated definitions—indicative of the basis on which the patents have been grouped and subdivided—reflects the stage of development existing in available guidelines at the time the schedule was created. Each schedule also reflects factors of ability, time, interpretation, and expediency. With this in mind it is difficult to specifically ascribe characteristics of a given class solely to the developmental stage of classification extant at the time. Nevertheless, with respect to many

old classes (created 28 years ago or more) there is no other way of understanding how the subject matter has been dealt with.

As previously indicated, the earliest known subclasses were simply an alphabetical ordering of typical titles applied to patent specifications. Many such titles were (and, unfortunately, still are) grossly inadequate as descriptors of the patentable subject matter. However, such alphabetically arranged titles very often evolved into rearranged schedules with definitions and positional superiority. As a result the sparse notes and definitions, so common during the first 25 years of "scientific" classification effort, often fail to make sufficiently clear the true inadequacy of such schedules—if approached by modern standards. Quite often in the past, for example, the use of identical titles in plural positions of a given class schedule created confusion. The subjective judgment of the individual examiner was exercised in the resolution of doubts and the selection of an appropriate locus for either search or assignment. In such cases, as individuals changed, the judgment changed so that after a period of time there were plural loci for the same subject matter.

As a specific example, take the following abbreviated schedule established as late as 1920:

- 1 ARTIFICIAL FUEL
- 2 Apparatus
- 10 Briquetting
- 11 Apparatus
- 27 Peat
- 28 Apparatus

The conflict posed by the existence and relative positions of subclasses 2, 11, and 28 could only be resolved by a blend of trial-and-error plus second guessing.

The cumulative effect produced today for many old classes is one of confusion. Classes established prior to World War II are suspect. Where an attempt to find pertinent references is not fruitful by utilizing the procedures set out in detail in Chapter 7, the definitions and notes of the particular class and subclasses must be further scrutinized for indications of basic variance from the general technique, for example, (a) has some concept been assigned as superiority—higher or lower—on a basis other than schedule position or statutory category, (b) has some area been arbitrarily designated as a residual locus despite the more restricted terminology of class and/or subclass title, or (c) has an examiner placed a strained meaning upon the language involved? Where even such indications are lacking, a sampling of the actual documents filed—plus consultations with individuals familiar with the class—may well be the only other alternative.

## *An Introduction to the U.S. Patent Classification System*

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Classification is a systematic arrangement or subdivision of subject matter along the lines necessary for facilitating the investigation or search of the subject matter. The U.S. Patent Classification System is an arrangement of all scientific and technical information encompassed by prior art to facilitate the selective retrieval of such information when desired. The prior art comprises both claimed inventions as well as scientific and technical disclosures in domestic patents and all other publications. The classification system is intended to make such information available to Patent Examiners in connection with the examination of patent applications, and to inventors in connection with investigations to determine whether a discovery is patentable or infringes a patent.

No effective precedents for patent classifications have been found in any prior classifications of the arts. The classification systems of the principal foreign patent offices have not been materially different in principle from the U.S. Patent Classification Systems of the past which have proven to be ineffective.

The most used library classification systems of the manual-access type are not suitable for the purpose of patent searching because they do not assemble all information relating to a particular feature in a unified group. In part these systems do analyse informational content, but generally they group items under academic or vocational head-

ings, or by date-span, or by format. A notation system is keyed against the classification schedule, and used to assign a location to each item classified. To save space and price-costs, each item stands in only one location, even though it is useful to several different subjects. The cost of retrieving all pertinent information on a particular scientific or technical subject is consequently high. Accessory tools other than the library classification schedule (indexes, bibliographies, subsystems, reviews, etc.) are required to aid searches. These tools supplement the classification schedule, leading now to one location, now to another.

A classification system directed to the ready finding of physical objects is, for some purposes, of great value. Substantially all manufacturing, wholesale and retail establishments have classification systems dealing with physical objects by means of which the workers, the salesmen, or the purchasers may readily find the particular object in which they are interested. Manufacturing establishments require an object classification by means of which their starting materials, intermediate products, and their complete objects may be readily made available to interested persons.

Those in the patent profession and others who are interested in scientific research and development and the evaluation thereof are concerned with ideas, information and facts. Therefore, a sharp distinction must be maintained between a classification system deal-

ing with physical objects and a classification system suitable for storage and retrieval of scientific and technical information.

The best analogies to a classification system suitable for the purpose of the Patent Office are in the known but changing classification systems of the natural sciences, and in them the problems are so different that they can serve only to illustrate the broad general principles. These broad principles of classification are well understood. The authorities are the logicians, such as the ancient Aristotle and the more recent Bentham, Mill, and Jevons. The effort of the Office of Patent Classification has been to adapt and apply these well-known principles to the enormously diversified useful arts.

The U.S. Patent Classification System must provide for storage and retrieval of the prior art which is available to a Patent Examiner in connection with the examination of patent applications and therefore must, in the aggregate, be exhaustive of all subject matter patentable under the patent laws. Ideally, the resultant system should provide a reasonably short and complete search for each type of investigation that is to be made; for example, the searches made by Patent Examiners to determine patentability, novelty and interference, and the correlative searches made by inventors and others relative to pre-examination, state of the art, evaluation, validity and infringement determinations. However, the system is primarily designed to provide for patentability searches by Patent Examiners.

A classification system suitable for the needs of the patent profession includes a clarification of the relationships of a mass of information units. It involves (1) reducing the number of individual problems by associating related units, or those having a predetermined degree of likeness, in large groups, (2) subdividing the groups into subgroups and (3) arranging the subgroups in

a sequence or pattern, which orderly presentation of the whole and its parts enables the mind of the user to grasp the nature and significance of the subject matter and the relationship of its parts more readily. The creation of a classification system of this type requires (1) an analysis of the units comprising the mass, made with full understanding of both subject matter and search problems and (2) synthesis of an arrangement of subject matter along the lines that searches must take. A Classifier, therefore, must be thoroughly knowledgeable of search problems, and be thoroughly competent in both patent law and the scientific and technical subject matter of the system to be developed.

The U.S. Patent Classification System is inclusive rather than exclusive. That is, a group or subgroup (e.g., class or subclass) providing for a particular feature or concept includes patents which claim (1) said feature, per se, (2) said feature in combination with any other feature and (3) subcombinations of said feature—unless, where in (2) or (3) such combination or subcombination, respectively, is provided for elsewhere.

No class or subclass title should be read with the word "only" as a limitation on such title unless, in fact, said word appears or is equivocally expressed in other terms of the title.

For example: a class entitled "Metal Deforming" would, in the absence of statements to the contrary, not only provide for (1) a bending or forging means, per se, but also for (2) a bending means in combination with an assembling means and (3) a work holder, per se, for holding material during bending. However, combinations and subcombinations such as (2) and (3), respectively, are stated to be in other classes which other classes are specifically identified with respect to particular subject matter.

Experience has shown that a classification system suitable to the needs of the Patent Office is useful in proportion to:

(1) The pertinence of the facts selected to be grouped together to the subject matter under investigation, or, in other words, the appropriateness of the basis of classification, presented in Chapter Two.

(2) The convenience, stability and uniformity of the arrangement of the subdivisions whereby a searcher may proceed with reasonable assurance and minimum effort to that portion of the system containing pertinent related subject matter, presented in Chapters Three and Four.

(3) The accuracy and clarity of the titles and definitions of the various subdivisions, presented in Chapter Five.

(4) The completeness and reliability of the cross-referencing and cross-notation also presented in Chapter Five.

(5) The uniformity, feasibility, and certainty of the principles by which new documents disclosing one or several inventions

may readily be diagnosed and assigned to the appropriate subdivision of the classification system in accordance with the basis adopted, presented in Chapter Seven.

The chapters that follow elaborate and illustrate the rationale developed with respect to the above five items for the U.S. Patent Classification System. Out of this rationale has been abstracted a group of principles upon which the system is based. These principles are each treated in detail in the appropriate chapter of this publication. However, as such abstracted principles are believed to be of interest both in more fully indicating the nature of the material to be covered and as a quick reference guide or synopsis, they are reproduced at this point in a collected body.

Each principle reproduced here is numbered for identification purposes and the chapter in which each is treated is as follows: principles 1-5, Chapter Two; principles 6-10, Chapter Three; principles 11-15, Chapter Four; principles 16-22, Chapter Five; principles 23 and 24, Chapter Seven.

## PRINCIPLES OF THE PATENT OFFICE CLASSIFICATION SYSTEM

### 1. *Utility as a Basis of Classification*

The principle basis for classifying the useful arts in the U.S. Patent Classification System is utility, that is, the function of a process or means or the effect or product produced by such process or means. Utility as a basis of classification must be taken in the sense of direct, proximate, or necessary function, effect or product rather than remote or accidental use or application as in industries or trades. Applying proximate function, effect, or product as a basis of classification will result in collecting together similar processes or means that achieve similar results by the application of similar natural laws.

### 2. *Proximate Function as a Basis of Classification*

Proximate function as a basis of classification is generally applied to processes or means for performing general operations in which a single causative characteristic can be identified and which requires essentially a single unitary act.

### 3. *Proximate Effect or Product as a Basis of Classification*

Effect or product as a basis of classification is generally applied to complex special results

of a process or means requiring successive manipulations involving plural acts.

#### ***4. Structure as a Basis of Classification***

Structural features such as the configuration or physical make-up of a means may be used as a basis of classification only when the subject matter to be classified is so simple as to have no clear functional characteristics, but can only be distinguished from other subject matter by its structural features. This situation rarely arises with respect to the creation of a large group or class in the system, but frequently occurs with respect to subdivisions within a large group or class. As between a classification system based upon structure and one based upon proximate function, effect, or product, the choice is for the latter in all situations in which it can be applied.

#### ***5. Basis of Classification Applicable to Chemical Compounds and Mixtures or Compositions***

A chemical compound should be classified on its structure, that is on the basis of its chemical constitution, regardless of the utility thereof. Mixtures or compositions, at least in the larger groupings, are generally collected on the basis of the disclosed utility for the particular material.

#### ***6. Analysis as a Prerequisite to System Development***

The U.S. Patent Classification System is created by analysing the disclosures of U.S. patents and then creating classes (including the schedule of subclasses within each class) by grouping together like subject matter as represented in the disclosures of such patents.

#### ***7. Patents Grouped by Claimed Disclosure***

Inasmuch as nearly every U.S. patent contains disclosure that is claimed and also disclosure that is not claimed, the general principle is that a classification system is created and a patent shall be assigned therein on the basis of that portion of the disclosure covered by the claims rather than on a portion of the disclosure that is not claimed. A disclosure that is not claimed is one that may form an element or step of a claimed combination as well as a disclosure not referred to in any claim.

#### ***8. Patents Diagnosed by Most Comprehensive Claim***

The totality of a claimed disclosure must be selected, whenever possible, in creating a classification system and determining the appropriate class to which a patent is assigned, but a mere difference in the scope or breadth of claims should not make a difference in assignment.

#### ***9. Exceptions to Claimed Disclosure Principle for Assigning Patents to Specific Class***

The following situations are exceptions to the principle that a system is created and the patents assigned therein on the claimed disclosure of U.S. patents. When these exceptions are applied, it should be clearly stated in the class definitions of the classes involved.

##### ***A. Old Combination With Specific Subcombination***

Where a patent claims a specific subcombination in combination with some other broadly recited subcombination, the combi-

nation and subcombination being classified in different classes, there are exceptions to the general principle that a classification system is created and a patent is assigned on the basis of the claimed disclosure; that is, the patent may be assigned to the subcombination class when all the following conditions apply:

- (1) A relatively large number of patents are involved.
- (2) The combination is old as a matter of common knowledge.
- (3) No new relationship between the subcombinations is set forth.
- (4) The other subcombination is nominally claimed.

#### *B. Article Defined by Material From Which It Is Made*

A patent for an article of manufacture, claimed by name only and in which the claim is otherwise directed to a specific material of which the article is made, is generally assigned to a class providing for the material rather than a class providing for the article.

#### *C. Process of Utilizing a Composition*

A patent claiming a process of utilizing a specifically defined composition may be assigned to the composition class where the process steps are nominally recited and the composition class provides specifically for compositions having that use.

#### *10. Exception to Claimed Disclosure Principle for Patent Assignment Between Subcombination Subclass and Indented Combination Subclass*

Where a parent subclass has indented thereunder a combination subclass which in-

cludes as a subcombination thereof the subject matter of the parent subclass, a patent disclosing the subject matter of the combination subclass but claiming only the subject matter of the subcombination subclass is assigned to the indented combination subclass.

#### *11. Exhaustive Division—Miscellaneous Subclass*

The subdivisions or subclasses of a class in aggregate should be exhaustive, that is, they should be susceptible of receiving any future invention that may fall within the scope of the class. Exhaustive division is secured by the presence of a residual or miscellaneous subclass.

#### *12. Exhaustive Nature of Coordinate Subclasses: Combinations To Precede Subcombinations*

Coordinate subclasses must each be exhaustive of the classification characteristic for which the subclass title and definition provides. That is, no subsequent coordinate subclass—nor any subclass indented thereunder—should provide for the characteristic of an earlier appearing coordinate subclass. Thus, in coordinate relationship, combinations including a detail must precede subcombinations to the detail, per se. A subsequent subcombination subclass receives disclosed combinations—which in their entirety are provided for in a preceding subclass—where only the subcombination is claimed; the disclosed combination is cross-referenced, if appropriate, to such preceding subclass.

#### *13. Indentation of Subclasses*

A class schedule is arranged with certain subclasses appropriately indented. In a prop-

erly indented schedule, subclasses at the extreme left in a column of subclasses are the main variants (referred to as a "first line subclasses") of the class. The titles and definitions of all these first line subclasses must be read with the title and definition of the class, as if indented one space to the right under the class title.

A subclass having indented subclasses under it represents a subject divided into variants. Such subclass also includes other variants not comprehended by the indented variants.

If no genus subclass is provided for the concepts of several subclasses which are in fact variants of a genus, the several subclasses should be positioned in the same area of the schedule where possible, as though they were indented under the unprovided-for genus.

#### ***14. Diverse Modes of Combining Similar Parts***

The classification system must recognize and provide for diverse modes of combining the same or similar parts or steps to obtain functionally (and possibly structurally) unrelated combinations.

#### ***15. Relative Position of Subclasses***

The relative position of subclasses in a single class is determined by the following principles:

(1) Characteristics deemed more important for purposes of search generally should be provided for in subclasses that precede subclasses based on characteristics deemed less important. However, some subclasses of lesser importance may require precedence of position to avoid their loss from the schedule.

(2) Subclasses based upon effect or special use should precede those based upon function or general use.

(3) Subclasses which are directed to variants of a concept should either be indented under the subclass directed to such concept or precede the same, and should not form or be part of a subsequent coordinate subclass or group of subclasses.

(4) Subclasses directed to combinations of the basic subject matter of the class with means having a function or utility unnecessary for or in addition to the function or utility of the basic subject matter should precede subclasses devoted to such basic subject matter.

#### ***16. Each Class and Subclass Must Be Defined***

In the U.S. Patent Classification System each class and subclass must be defined, that is the title of each class or subclass must be explained in a detailed statement setting forth the metes and bounds of the area of subject matter for each class and subclass. A class and subclass definition must include a description of the subject matter encompassed by the class or subclass and may include any necessary explanatory and search notes.

#### ***17. Tentative Definition***

A tentative or preliminary definition of a class to be created is written as soon as possible after determining the initial scope of the class. This tentative definition should be modified, if necessary, as the project progresses and as more subject matter is considered. This same principle applies to a subclass definition, that is, a tentative definition is written as soon as possible after a subclass is created and should be modified, if necessary, as more subject matter is considered.

## 18. *Explanatory Notes for Class or Subclass Definition*

In many instances, explanatory notes relating to excluded subject matter, the explanation of some term or expression used in the definition, statements intended to further clarify the definition, etc., may be appended either to a class or subclass definition.

## 19. *Search Notes for Class or Subclass Definition*

To supplement or take the place of cross-referencing, search notes are needed, giving directions and suggestions for further search, setting out the relationship and lines of distinction between classes and subclasses. Search notes should indicate other classes or subclasses directed to analogous or related subject matter. Search notes should also indicate classes or subclasses directed to subject matter constituting either a combination or subcombination of the class or subclass in which the note is written. However, care should be taken when writing a search note indicating a class directed to a subcombination which is common to subject matter of several classes. The Index to Classification is a useful guide in locating such subject matter.

## 20. *Cross-Referencing*

Nearly every patent discloses subject matter that is classifiable in a different class or subclass than that which provides for the subject matter of the controlling claim. In the U.S. Patent Classification System such different subject matter is appropriately provided for by the assignment of one or more cross-reference copies. Such subject matter falls

into two categories, (1) subject matter which is separately claimed, per se, in a claim other than the controlling claim and (2) subject matter which is disclosed but not claimed, per se, in a claim other than the controlling claim.

## 21. *Cross-Referencing Claimed Disclosure*

Where a patent has several claims which if separately found in different patents would effect assignment of such patent in different subclasses, either in the same or in different classes, original assignment of the patent is on the basis of the most comprehensive claim as between classes and schedule superiority within a single class. It is obligatory in such instances to cross-reference the patent to the subclass or subclasses providing for the subject matter of such other claims, unless search notes are provided which would lead a searcher to the subclass to which the patent is assigned on the basis of the most comprehensive claim.

## 22. *Cross-Referencing Unclaimed Disclosure*

Any disclosure in a patent which is disclosed but not claimed, per se, may be cross-referenced into any part of the classification system at the discretion of the Classifier. The following criteria, should be considered for such cross-referencing: (1) the disclosure must, in the best judgment of the Classifier, be novel and (2) the disclosure must be of sufficient detail and clarity to be useful as a reference. No cross-reference is made when a search note is appended to the definition of the subclass eligible to receive the cross-reference, indicating that the subclass containing the original copy of the patent must be searched.

### 23. *Superiority Among Classes*

A. With respect to an application or patent directed to one claimed disclosure assignment is to the class that is the locus of the prior art for the same subject matter. The identity of the proper class is established through study of class definitions and notes of classes suggested by the Index to Classification or lists of classes or by personal knowledge of the location of the prior art.

B. With respect to an application or patent including claimed disclosures to diverse inventions, the principles listed below must be considered and applied, if appropriate, stepwise, in the order listed to select the single disclosure that will control assignment as in A above:

(1) Most comprehensive claimed disclosure governs.

(2) Order of superiority of statutory categories of subject matter.

(a) Process (of using product b, e.g. using a fuel or radio transmitter).

(b) Product (of manufacture, e.g. a fuel or radio transmitter).

(c) Process (of making product b).

(d) Apparatus (to perform c or to make b, e.g., machine, tool, etc.).

(e) Material (used in c to make b).

(3) When, and only when, principles 1 and 2, given above, fail to solve the question of the controlling class, the relative superiority of types of subject matter as shown by the following list is used:

(a) Subject matter relating to maintenance or preservation of life is superior to subject matter itemized in b-d below.

(b) Chemical subject matter is superior to electrical or mechanical subject matter.

(c) Electrical subject matter is superior to mechanical subject matter.

(d) Dynamic subject matter (i.e. relating to moving things or combination of relatively movable parts) is superior to static subject matter (i.e. stationary things or of parts nonmovably related).

### 24. *Superiority Within a Class*

Where different subclasses of the same class are involved, the patent will be assigned to that one of several subclasses defined to receive the several claimed inventions which stands highest in the schedule of subclasses.

## *Bases of Classification*

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*Sections:*

- 200 Introduction
- 201 Utility as a Basis
- 202 Proximate Function
- 203 Proximate Effect or Product
- 204 Choice of Basis Determined by Subject Matter

*Sections:*

- 205 Structure as a Basis
  - 206 Basis Applicable to Chemical Compounds, and Mixtures of Materials
  - 207 Summary of Principles Relating to the Bases of Classification
- 

### 200 *Introduction*

The U.S. Patent Classification System is designed primarily to provide for patentability searches by Patent Examiners; thus it follows that the appropriate statutes and relevant court decisions pertaining to patentability must be considered. However, a determination of what is "new", what is "identical", what is "obvious . . . . to a person having ordinary skill", what is "analogous art" or the semantics of claim terminology goes far beyond the scope of this publication. All that can be stated here is that the conclusions expressed in the following sections and chapters are predicated upon those pertinent decisions which seem most soundly based upon the technological facts and which represent the best reasoned interpretations of the applicable law.

Though a chosen basis of classification for any group of patents may not satisfy each and every requirement of the law, the basis hereinafter set forth is deemed to be optimum for the factors involved. It must be noted that when a Classifier brings certain subject matter together this also becomes a further factor in the determination of what is "obvious" or "analogous."

The first and most vital factor in any classification system is the basis of division, that is, the kind of unique property common to any number of objects selected to characterize a group, whereby the individuals of the group will resemble each other for the purpose in view more closely than any individual in any other group. For example, a number of books could be divided into groups (1) according to the subject of their contents; (2) according to the language in which the books are written; (3) according to the size of page; (4) according to the binding material; or (5) according to the color of the binding. Each of these may be useful classifications for some purpose. For the student of literature none is of value except the first; for the connoisseur of bindings, only the last three. A classification of animals into classes of land animals and water animals would hardly suit a student of zoology, as it would associate with the shad or perch such differently organized creatures as the porpoise, whale or seal. Yet such a classification might prove very suitable for a student of fisheries.

### 201 *Utility as a Basis*

As all inventions are made with the object of satisfying some human desire, the utility

of an invention appears to be a natural basis of classification. It is apparent, however, that most inventions may contribute to numerous utilities. A plow has use as an agricultural instrument for preparing a field for planting or as an instrument of civil engineering for rounding a road bed. There are many uses for a heat exchanger comprising a coil of pipe. It might be used, for example, to condense steam or to condense alcoholic vapors depending on the material treated. Also it might be used as a cooler or heater depending on the temperature of the fluids circulated through it. Underlying all of these utilities there is a fundamental one to which the analytical mind will reach in its natural processes and there rest. The plow loosens or turns over the surface of the earth; the coil effects an exchange of heat between its exterior and interior. A classification of plows in either agriculture or road building, or a classification of a heat exchange coil as a steam condenser, still, water cooler, refrigerator, or house heater depending on its stated use appears to separate things that are essentially alike. However classifying a plow on its necessary utility of earth working, the heat exchange coil on its necessary utility of exchanging heat results in getting very similar things together.

A proper distinction must be maintained between necessary utility as used here and accidental industrial uses as in the trades. Failure to maintain such a distinction will result in classifying related processes or means in separate classes because of the stated remote or accidental uses (for purposes of this presentation the expression "process" is used to designate all inventions directed to a step or a series of steps to accomplish a particular result and the expression "means" is used to designate all inventions other than a process). The following examples illustrate actual situations in which similar processes or means were classified in different classes because of the stated use. Patents directed to heat exchange de-

vices were classified in three different classes because the disclosed use of one was for cooling water, of another for heating water, and a third for sterilizing milk; also patents directed to filtering devices were classified in three different classes because the disclosed use of one was for separating solids from the gases discharged from a metallurgical furnace, of another for separating carbon from the combustion gases of a steam boiler furnace, of a third for removing the dust and tar from a combustible gas. If these devices had been classified on their necessary utility of heat exchange and gas and solid separation, respectively, rather than on their accidental or industrial utilities, the heat exchange devices would have been in a class of heat exchange and the filtering devices would have been in a gas separator class, thus resulting in classifying related means together.

Thus it is deemed more logical to adopt as a basis some utility that must be effected by the means under consideration when put to its necessary or basic use rather than some remote or accidental utility that may be effected under some condition.

The U.S. Patent Classification System is based upon utility in the sense that it collects together similar processes or means that achieve similar results by the application of similar natural laws to similar substances, that is, utility in the sense of proximate, necessary, or direct utility, meaning a fundamental or elemental utility as distinguished from a remote, accidental, or indirect utility as generally applied in industries or trades. For purposes of brevity the expression "proximate" will be used to mean, direct or necessary in the presentation that follows.

The term "utility" means usefulness when applied to a process or means. Usefulness of a process or means may have reference to (1) the function which the process or means performs, (2) the effect of the proc-

ess or means or (3) a product which is produced by the process or means. As examples of the above, (1) a hammer is useful in that it performs an impacting function, (2) a telephone system is useful in that it has the effect of communicating sound and (3) a shoemaking machine which cuts, cements, and stitches is useful in that it produces shoes as a product. By utility then as applied to a process or means is meant function, effect or product. As stated above utility as a basis of classification must be taken in the sense of proximate utility, therefore it follows that the terms "function," "effect" or "product" when used to mean utility and applied as a basis of classification must also be taken in the sense of proximate function, effect or product. These terms, properly defined, form the principal basis for the U.S. Patent Classification System and will now be presented in detail.

## 202 *Proximate Function*

Function is the action of means upon an object for producing an effect. A function may be direct or indirect, proximate or remote, necessary or accidental. The direct, proximate, or necessary function of a hammer in normal operation is impacting. Some indirect, remote, or accidental functions of a hammer may be comminuting, forging, or driving.

Proximate function has particular significance in connection with a dynamic device designed to perform a single unitary act where it has long had a meaning descriptive of the dynamic nature of the device (e.g. drilling machine). Static structures, even though nondynamic, in their names and associations carry inevitable implications of causing or functioning (e.g. chair, table) and are classified on the basis of proximate function. Since processes carry their own statement of func-

tion (e.g. coating process), their classification on the basis of proximate function seems natural.

The association of various processes or means of the useful arts on the basis of a broad proximate function common to all such means may proceed too far. Oversimplification must be avoided. A hammer may be used for cracking nuts or driving nails, and in recognition of the need for classifying a patent to a hammer for cracking nuts and a patent to a hammer for driving nails together, the broad concept of "implements for striking a blow" may suggest itself. This broad concept also embraces golf clubs, drum sticks, and other instruments which have a total organization and characteristics that are distinct from hammers, thus making it undesirable to classify patents to these devices with hammers. The connotations of the word "hammer" may be important in distinguishing characteristics distinct from golf clubs and drum sticks. Thus the broad concept of "implements for striking a blow" may be an oversimplification. It may actually be the designation of a function common to many diverse instrumentalities, essential to each but failing as a basis for distinguishing things of little or no reference value for each other.

It is apparent from the foregoing that the term "proximate function" is incapable of exact definition and that the precise limits thereof relative to any body of subject matter may not be determined before a detailed study of that body of subject matter. It is only after careful study, analysis, and intercomparison of all pertinent disclosures and surrounding areas of invention that a Classifier can determine the metes and bounds of the subject matter area he wishes to include within the scope of a particular classification system. Proximate function should represent the Classifier's concept of where the limits of the metes and bounds lie. Proximate function, as the Patent Classifier uses it, is the level

or degree of similarity of ideas among items of the useful arts at which the best search fields develop. Classification, on the basis of proximate function, should result in associating together those technical embodiments which solve similar problems by the application of similar natural laws to similar substances.

### 203 *Proximate Effect or Product*

Effect is the result of a process or of the function of a means of the useful arts. An effect may be tangible or intangible. A product is a tangible effect of a process that changes the form, state, or ingredients of matter perceptibly and permanently as distinguished from an effect that is fleeting or involves no change in perceptible form, state, or ingredients of matter. Effects both tangible and intangible may be direct or indirect, proximate or remote, necessary or accidental and therefore may or may not form a proper basis for classification. An effect may be considered to be the proximate effect and may be used as a basis of classification in instances where it is the only or necessary effect that can result from a process of function of the means.

In the field of complex machines and processes, there are many diverse separate successive operations involving plural acts, for example, the application of plural forces or taking advantage of several properties of matter, so that a single causative characteristic cannot be identified. The result is not the utility of any one of them, but something which has developed or changed in character as a result of the contribution of each. The only related utility of all the diverse mechanisms which make up a shoemaking machine which cuts, cements and stitches arises from the fact that only shoes can be made. The only continuously present utility of the multitude of mechanisms found in a telephone system is communication of sound at a distance. Both

of these utilities are identifiable as results, the first tangible, the second intangible. For convenience in distinguishing between the two the terms "product" and "effect" are used. The shoemaking machine is classified on the basis of its product, the telephone system on the basis of its effect.

### 204 *Choice of Basis Determined by Subject Matter*

Function is closely related to cause. Effect or product are related to result. It is held to be an axiom of logic that cause is preferable to result as a basis of a classification system designed for scientific research. Since the search for technological information needed to determine patentability is akin to scientific research and since patent claims usually deal with details of causative means or steps for achieving an effect or result, the functional basis is preferred in all cases in which it can be applied. Generally, this basis can be applied to processes and means for performing general operations requiring essentially a single unitary act, for example, the application of a single force or the taking advantage of a single property of matter, such as cutting, molding, heating, or cooling. For example, the process of making a button by the single step of molding a substance to proper shape should be classified in a general class of molding. However, operations directed toward complex special results such as the making of shoes, buttons, or nails by a process which requires diverse successive manipulations involving more than a single unitary act, cannot be classified on the basis of function, and should be classified on the basis of effect or product. For example, the process of making a button by the combined operations of sawing, grinding, turning, and drilling is classified in a class based upon the product, to wit: button making.

## 205 *Structure as a Basis*

Proximate function, effect, or product are the principal bases upon which the useful arts are assembled, particularly into the large groups or classes in the U.S. Patent Classification System. This is clearly shown by the titles of most of the groups or classes in the system (e.g., Earth Working, Metal Working, Material or Article Handling, Package Making, etc.). Inventions directed to a process must of necessity be classified on the basis of function, since a process inherently involves a function (e.g., metal deforming process). However, in the field of means, it may be that a certain type of subject matter presented for classification is so simple and of such general utility as to make it impossible to find a proximate function, effect, or product upon which to distinguish such subject matter from other means. In such case, a class based on structure may be the only way of satisfying the needs of the classification system. For example, a structure-based class would be necessary in a situation where the subject matter to be classified is so simple and of such general utility as to have no clear functional characteristics; its only distinguishing feature being its shape (e.g., spiral, tubular, round, curved, etc.) or its physical make-up (e.g., multilayered, interwoven strands, honeycombed, etc.). A tubular structure may be used as a fence post when combined with proper means to which other fence elements can be secured, or it can be used to form an engine cylinder when combined with an end closure having proper engine motive fluid openings, or it can be used as a container when combined with means for closing the ends thereof, or it may be used as a gun barrel when combined with the proper gun appurtenances. Yet the tube itself, in the absence of the enumerated adjuncts combined therewith, cannot be said to have any proximate function and can only be classified on the basis of its structure. Stock material, also,

has no clear functional characteristic upon which it may be subdivided for purposes of classification, and its physical make-up constitutes the only characteristic which can be used to differentiate such material from other means.

Structure, then, can be used as a basis of classification for some means but a careful analysis of its meaning and limitations is necessary. Structure should be used as a basis of classification only when the subject matter to be classified has no clear functional characteristic. This must be carefully observed, because even in a simple device the relationship between the parts is more necessary than a catalog of the parts, and that relationship can best be expressed in terms of what the assembly can accomplish. In the more complex means structural classification is very difficult to apply because of the infinite variety of mechanical combinations, both as to association and relationship of parts, and an attempt to classify such means on structural features might well result in confusion. The resultant classifications system would tend to be a mere digest of mechanical elements having no community of function and for that reason would not serve the purpose for which the U.S. Patent Classification System is intended.

Another situation in which structure may be used as a basis of classification is in dividing a large group or class into subgroups or subclasses. While it is generally desirable to base such subgroups on proximate function, effect or product, frequently, in the refinement effected by the formation of such subgroups, the differences between subject matter of one subgroup and that of another are so fine that it is impossible to find a suitable proximate function, effect or product on which to subdivide. Thus structural features may be the only available basis for distinguishing the subject matter in the different subgroups.

In conclusion, it must be stressed that a structural classification is sometimes necessary

under special circumstances. But, as between a classification system based upon structure and one based upon proximate function, effect or product, the choice is for proximate function, effect, or product in all applicable situations.

## 206 *Basis Applicable to Chemical Compounds and Mixtures of Materials*

Chemical compounds are substances of definite constitution consisting of atoms combined to form similar molecules. Mixtures, or compositions, are substances, other than compounds, comprised of different materials associated in various proportions.

In the field of chemical compounds it is deemed advisable to collect the patents into groups on the basis of the structure of the compound, without regard to function or use of the compound, where the structural formulae of the compound is in fact known. Because properties of the families of compounds have a marked degree of analogy, the structural basis of classification brings together those materials that most nearly approximate each other for reference purposes. Organic compounds, by way of example, are collected together and subdivided largely on the basis of chemical structure and constituents.

Compositions or mixtures are generally collected, at least in the larger groupings on the basis of disclosed utility. By way of example, mixtures or compositions containing an organic compound as an ingredient, and disclosed for use as a medicine, are collected with other patents related to medicinal mixtures or compositions. The properties of mixtures are not predictable to the same degree as are the properties of compounds, therefore it would appear desirable to select utility as a primary basis for collecting patents relating to mixtures of materials. This is without prejudice to those special cases in which the composition per se is

demonstrated to be the best basis for classification. Metal alloys, for example, seem to be best classified on the basis of the materials of the alloy without regard to the particular use. However, having collected all patents to mixtures for a particular utility, further subdivision might well proceed on the basis of the specific ingredients of the mixture.

## 207 *Summary*

### UTILITY AS A BASIS

The principal basis for classifying the useful arts in the U.S. Patent Classification System is utility, that is, the function of a process or means or the effect or product produced by such process or means. Utility as a basis of classification must be taken in the sense of direct proximate, or necessary function, effect or product rather than remote or accidental use of application as in industries or trades. Applying proximate function, effect, or product as a basis of classification will result in collecting together similar processes or means that achieve similar results by the application of similar natural laws.

### PROXIMATE FUNCTION AS A BASIS OF CLASSIFICATION

Proximate function as a basis of classification is generally applied to processes or means for performing general operations in which a single causative characteristic can be identified and which requires essentially a single unitary act.

### EFFECT OR PRODUCT AS A BASIS OF CLASSIFICATION

Effect or product as a basic of classification is generally applied to complex special results of a process or means requiring successive manipulations involving plural acts.

#### STRUCTURE AS A BASIS OF CLASSIFICATION

Structural features such as the configuration or physical make-up of a means may be used as a basis of classification only when the subject matter to be classified is so simple as to have no clear functional characteristics, but can only be distinguished from other subject matter by its structural features. This situation rarely arises with respect to the creation of a large group or class in the system, but frequently occurs with respect to subdivisions within a large group or class. As between a classification system based upon structure and

one based upon proximate function, effect, or product, the choice is for the latter in all situations in which it can be applied. ✓

#### BASIS OF CLASSIFICATION APPLICABLE TO CHEMICAL COMPOUNDS AND MIXTURES OR COMPOSITIONS

A chemical compound should be classified on its structure, that is on the basis of its chemical constitution regardless of the utility thereof. Mixtures or compositions, at least in the larger groupings, are generally collected on the basis of the disclosed utility for the particular material.



## *Analysis of Scientific and Technical Subject Matter and Subdivision of Such Subject Matter*

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*Sections:*

- 300 Introduction
- 301 Analysis as a Prerequisite to Creating a System
- 302 Claimed Disclosure Used to Create System
- 303 Class Assignment of Original Based on Most Comprehensive Claim
- 304 Exceptions to Claimed Disclosure Principle for Class Assignment of Patent
- 305 Old Combination With Specific Subcombination
- 306 Article Defined by Material From Which it is Made
- 307 Process of Utilizing a Composition
- 308 Patent Assignment Between Subcombination Subclass and Indented Combination Subclass
- 309 Patent Assignment Between Generic Subclass and Indented Species Subclass
- 310 Assignment of Cross-Reference Copies
- 311 Type of Subject Matter to be Classified
- 312 Categories of Subject Matter
- 313 Processes
- 314 Manufacturing Process
- 315 Non-Manufacturing Process
- 316 Machines, Manufactures, and Compositions of Matter
- 317 Product
- 318 Apparatus for Making a Product

*Sections:*

- 319 Material Used in Process to Make Product
- 320 Relationship Among Categories
- 321 Combination, Subcombination
- 322 Classified in Same or Separate Class
- 323 Subject Matter of a Class
- 324 Determination of Basic Subject Matter
- 325 Differently Related Subcombinations Form Diverse Basic Subject Matter
- 326 Hierarchy of Subject Matter
- 327 With Combined Feature: Subcombination
- 328 Classification of Each Character of Subject Matter
- 329 With Features for Different Function
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- 331 Subcombination or Element
- 332 Summary Chart
- 333 Overlapping Classes
- 334 Categories of Subject Matter Classified in the Same or Separate Classes
- 335 Process and Product Made
- 336 Apparatus and Product Made
- 337 Process and Apparatus for Its Practice
- 338 Process and Material Used
- 339 Product and Material Used
- 340 Summary of Principles Relating to the Analysis of Scientific and Technical Subject Matter and Subdivision of Subject Matter

### 300 *Introduction*

As stated in Chapter One the purpose of a classification system suitable to the needs of the patent profession is a clarification of relationships among information units involving (1) the reduction in number of individual problems by associating related

units into large groups, (2) subdividing the large groups into subgroups and (3) arranging the smaller groups in a sequence or pattern. In the U.S. Patent Classification System each large group is called a class, each subgroup a subclass, and the sequence or pattern arrangement of the subclasses a schedule.

The preceding chapter dealt with the first factor involved in creating a suitable classification system, the selection of a proper basis upon which the subject matter is classified. However, a proper basis cannot be determined unless a thorough knowledge of the character and type of subject matter to be classified is acquired. The present chapter deals with a consideration of some aspects of the subject matter to be classified, the method of analyzing such subject matter and the adaptation of such analysis in the creation of classes.

In the U.S. Patent Classification System, the subject matter to be classified is contained in documents of three general types (1) U.S. patents, (2) foreign patents, and (3) nonpatent publications.

U.S. patents, the sole records used in creating the system, constitute the best type of document to illustrate the way to analyze for all pertinent subject matter. U.S. patents contain the same type and character of subject matter as do foreign patents and nonpatent scientific and technical publications. U.S. patents have, in addition, claims which cover the portion of the total disclosure that is secured by the patent. Thus, U.S. patents illustrate the mode of analysis common to all documents within the field of science and technology and also illustrate the specialized problems in connection with claims. For this reason the discussion of analysis of documents for the development of classes and subclasses in the system will be restricted to U.S. patents.

The analysis of U.S. patents during the development of a schedule should be conducted for the following two purposes:

(1) For classification schedule synthesizing.

(a) To differentiate the subject matter of the class being developed from the subject matter of other classes.

(b) To form subclasses and arrange such subclasses in a schedule.

(2) For all contained novel information units. Substantially every document analyzed in connection with the creation of a new class or for original assignment of such document in an existing class contains information pertinent to portions of the class other than that portion to which it is assigned or to other classes. Therefore the Classifier must extract from the document all information units contained therein to properly place all novel scientific or technical information wherever it may be useful in the system.

### 301 *Analysis as a Prerequisite To Creating a System*

A fundamental principle of the U.S. Patent Classification System is that the system is created by simultaneously analyzing the disclosures of U.S. patents and creating the various classes and subclasses on the basis of such analysis, rather than by first making a theoretical schedule of classes and subclasses and then attempting to assign the subject matter into such schedule. It can be seen that by this method a schedule of classes and subclasses is dependent on the subject matter to be classified; that is, it is built up piece by piece in accordance with the subject matter to be classified. Since a patent specification and drawing generally discloses a greater amount of subject matter than that which is claimed, the question arises as to whether the classification system should be predicated on that subject matter in the patent which is claimed or on the totality of the disclosure.

### 302 *Claimed Disclosure Used To Create System*

That which is claimed in a patent is that which is patented, but that which is only disclosed therein is also of anticipatory value. Therefore, since a primary purpose of the classification system is to assist Patent Examiners in finding anticipatory subject matter, the most natural procedure, at first thought, would be to classify on the totality of the disclosure. However, adopting this principle would result in a multiplicity of loci for identical subject matter. Speed-changing gears, for example, would be now here and now elsewhere, as illustrated by the inventor, in accordance with the accident of use in motor vehicles, milling machines, lathes, merry-go-rounds, etc. The Classifier would constantly face the problem of whether or not an entire disclosure included sufficient features of a machine to justify assigning the patent to the class providing for the machine, or to a class providing for a subcombination of such machine. Further, this problem would be compounded by the fact that different Classifiers could select different portions of similar disclosures for assignment, with the effect that very similar disclosures would be classified in one class or another depending on that portion of the given disclosure selected by the different Classifiers.

The claims of a patent are the statutory indices of that which the applicant believes to be new and inventions that have been searched by the Patent Office and found not anticipated. No one knows what the future lines of search will be. The only guides for future searches are the searches of the past and the evidence of past searches is the claims of patents in that they trace the course of invention. Furthermore, a presumption of novelty attaches to the claimed subject matter. No such presumption attaches to the unclaimed subject matter. The great weight of probability, therefore, is that subject matter claimed is new and that the rest

not claimed is not new. Thus, it seems reasonable to suppose that better results will follow by creating a classification system based on claimed subject matter in a patent, which claimed subject matter is presumptively new. Further, by adopting claimed subject matter as the basis upon which a system will be created and developed and patents subsequently assigned thereto, a workable standard is set. In the speed changing gear example set forth above there then would be no necessity to determine the extent to which the machine is disclosed, since it would not be important for purposes of classification. Patent infringement is predicated entirely upon claimed subject matter. To the extent that such claimed subject matter is the basis upon which a system is created and developed the system also serves as a useful tool for infringement searches. Since the claimed disclosure is used both to create a classification system and to subsequently assign a patent therein, it should be understood that in this section and in sections 303 through 309, the term "assignment" is used to designate both the placement of a patent for creating a system and the subsequent assignment of a patent into the completed system. For a discussion limited to the assignment of a patent into a completed system see section 708.

### 303 *Class Assignment of Original Based on Most Comprehensive Claim*

In some instances a patent may contain plural claims each of which covers the disclosed subject matter in varying degree. For example, a patent discloses a pump having a cylinder, a piston, and inlet and exhaust valves; one claim in the patent encompasses the entire disclosure of cylinder, piston, and valves classifiable in one class; while a second claim is directed solely to the valves, classifiable in a second class. The question is whether

the patent should be assigned to the class providing for the cylinder, piston, and valves or to the class providing for the valves, per se. In this situation it appears more logical to base the assignment on the claim which encompasses the largest amount of the disclosed subject matter, which for purposes of further discussion will be referred to as the most comprehensive claim. Thus in analysing patents for purposes of creating a classification system and for assignment of patents among classes in the existing system the subject matter of the most comprehensive claim is used.

This initial or primary basis for patent analysis and subsequent assignment relates to what is designated as the "original" patent copy in the classification system. (See section 527 for an explanation of the purpose of, and the distinction between, an "original" patent copy and a "cross-reference" copy.)

#### 304 *Exceptions to Claimed Disclosure Principle for Class Assignment of Patent*

Practical experience over a long period of time has indicated that rigid adherence to a classification procedure predicated entirely upon the claimed disclosure will not always result in the creation of a system best suitable for search purposes. Therefore an exception to this principle has been applied in four different situations: (A) where the claimed disclosure is directed to an old combination, (B) where the claimed disclosure is directed to an article defined by the material from which it is made, (C) where the claimed disclosure is directed to a process of using a composition, and (D) where a patent claims the subject matter of a subcombination subclass and discloses subject matter of a combination subclass indented under such subcombination subclass. Each of these situations is presented in detail below.

#### 305 *Old Combination With Specific Subcombination*

Theoretically, no two patents should be directed to the same combination of things, steps or relationships. In actual practice, there are many instances where patent after patent claims the same combination with differences recited only in subcombination features. If we make certain that the patents which an Examiner is searching in a combination class really relate to the combinational relationship defined by that class we are making his search more effective. However, if we encumber a combination class with patents which are related to old and exhausted combinations differing from each other only in some specific element of the combination, we have not only made his search less effective, we have also compounded the storage problem by providing a useless copy of a patent. For example, assume that a very large group of patents for an auto all disclose a body (A), a motor (B), a transmission (C), and wheels (D) and that the most comprehensive claim in each patent is ABCD. The differences among most of the patents, some expressed in claims and some not, reside in only variations of the individual elements—A or B or C or D (for example A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, or B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub> . . . etc.). Further assume that most of such variations in the individual elements do not in any way effect a patentable change in the combinational relationships involved in ABCD. A rigid adherence to the general principle would result in the creation of a system with all of the above patents grouped together on the basis of an ABCD combination. Extensive cross-referencing elsewhere would be required to provide for both the claimed and unclaimed variations of subcombinational features. Indeed, every such patent would have to be assigned, on a cross-reference basis, to take care of what the Classifier recognized to be the only reference value for each patent. One

searching for particular subcombinations under such circumstances would suffer no hardship—every subcombination locus would be complete with only pertinent cross-reference copies. Similarly, one looking for the general ABCD combination would have no trouble in that any patent from the group would do. However, when so grouped together one attempting to find a previously unrecognized variation in the combinational relationships of ABCD would face a formidable and tedious task. As indicated above, in most instances the Classifier has found no combinational difference among the patents grouped together. Nevertheless the searcher would have to study each one before casting it aside. The more patents a searcher must needlessly handle and study the sooner the onset of fatigue accompanied by a greater likelihood of error. Since the number of patents involved directly determines the time necessary to complete a search, needless patent copies in a classification system is always reflected by greater expense in utilization of such system.

To minimize the need for extensive cross-referencing—with the attendant space and cost problem—and, perhaps more important, to improve the search situation, an exception to the general principle may be applied, and disclosures may be assigned on the basis of a specifically claimed subcombinational feature rather than on the claimed combination. Since this is an exception, it should be applied with discretion and only when all the following conditions are present:

(1) The subject matter involved includes a relatively large number of patents, which if kept in the combination class would be difficult to subdivide on a combinational feature, and would have little reference value for one searching for a combination feature and all of these patents would have to be

cross-referenced in the proper subcombination class.

(2) The combination claimed is old as a matter of common knowledge.

(3) No relationship between the various elements of the combination is set forth other than the position of these elements relative to each other in the manner shown in all other disclosures to such combination, and having the same mode of operation and performing the same function as said combination in these other disclosures.

(4) No structural detail of any of the elements other than the specifically recited element is claimed, that is, the elements other than the element specifically claimed must be nominally claimed. Care must be taken when applying this latter concept not to confuse nominal with conventional. "Nominal" signifies by name only with no details of the structure of the element given, while "conventional" could include specific details of the element all known to be old. Under extreme circumstances it may be desirable to expand this criterion to include some minor, conventional structural limitations or details of the element other than the specifically recited elements, but when this is done, it should be clearly spelled out in the definitions and notes.

5. Whenever this exception is used it should, like all other exceptions, be clearly set forth in the notes of the classes involved to alert a searcher to the placement of such subject matter, and more importantly to inform Patent Examiners so that they may assign patent applications and newly issued patents to the proper class.

### 306 *Article Defined by Material From Which It Is Made*

Another situation, analagous to the one set forth above and an exception to the gen-

eral principle, involves a patent claim reciting a particular article by name only plus the material of which said article is made. For example a claim reciting, "A razor comprising composition r, s, and t", represents a combinational concept of article and material. However, under the U.S. patent statutes and applicable court interpretations, a patent grant to a particular material covers not only the material in the disclosed or claimed environment but also the identical material in any environment. Therefore, since a named article recited in combination with a particular material depends solely upon the particular material for patentable merit and the search must always encompass the locus of classification assigned said material, it has generally been found most effective to assign a patent claiming such combination as an original on the basis of the material, *per se*. This technique eliminates what has proven to be an unnecessary copy of the patent elsewhere in the search files. As with other exceptions, the definitions and notes of the pertinent class, or classes, should clearly set forth the instances where this exception is applied.

### 307 *Process of Utilizing a Composition*

Where a process of utilizing a composition is provided for in a class other than that providing for the composition *per se*, normal procedure is to assign patents claiming the process to the process class in accordance with the principle of assigning patents on the basis of the claimed disclosure. In some circumstances, however, a claim reciting a process of utilizing a specifically defined composition or material, which process comprises a nominally recited use of the composition or material may be assigned to the class providing for the composition or material rather than to the process class.

The particular circumstances requiring the exception must be carefully analyzed in each instance. One circumstance under which the exception to the general principle is followed may be that the nominal process is classified in a mechanical class while compositions for that use are particularly provided for in a composition class. For example the class of Refrigeration provides for processes in which a particular material is used in a refrigeration circuit. The class of Compositions provides for heat-exchange compositions. The class definition of the class of Refrigerating states that the class of Compositions provides for processes of refrigeration comprising any known cycle and distinguished solely by the composition or compound therein when apparatus structure is not included.

As another example, patents claiming a process of using a coating composition normally assignable to the class of Coating: Processes and Miscellaneous Products, may be assigned to the class of Coating Compositions if the process is nominally recited. However as stated in the class definition of the process class, these patents may be assigned to such coating composition class only if there is also present in the patent a claim to the composition *per se*.

As demonstrated by the above examples, the Classifier must be careful to fully annotate this exception to the general principle and set forth the details of the exception in the definitions and notes. The limits of what is a "nominal" process must also be precisely stated.

### 308 *Patent Assignment Between Subcombination Subclass and Indented Combination Subclass*

Where a parent subclass has a combination subclass indented thereunder which in-

cludes as a subcombination thereof the subject matter of the parent subclass, a patent which discloses the combination of the indented subclass but claims only the subject matter of the parent subcombination subclass is assigned to the indented combination subclass on the basis of the disclosed subject matter.

This exception to the general principle may best be illustrated by the following example depicting a hypothetical arrangement of subclasses:

Spring  
     With lubricating means  
     With indicating means

In the above arrangement a searcher desiring to find the combination of a spring having lubricating means should expect to find all such combinations in the indented subclass "With lubricating means." However a search for a spring per se, or a spring combined with some feature not specifically provided for in an indented subclass cannot be limited to the subclass "Spring," but must include this subclass and all subclasses indented thereunder.

Were the general principle of patent assignment on claimed disclosure followed, a patent disclosing a spring combined with a lubricating means—but claiming only the spring—would be assigned to the subclass "Spring." However, to attain the search pattern of the preceding paragraph a cross-reference would also need to be placed in the indented subclass "With lubricating means." A patent copy may be eliminated by assigning such patent directly to the indented subclass on the basis of the disclosure. Then, with respect to the subclass "Spring" and its indents, the search for a spring combined with a feature specifically provided for in an indented subclass can be restricted to that indented subclass, while a search for either a spring, per se, or a spring combined with a feature unprovided for by an indented subclass must

include both the subclass "Spring" and all indented subclasses.

This exception requires patent assignment to an indented subclass on the basis of claimed or unclaimed disclosure and still provides a restricted, but complete, search for all combinations specifically set out in the indented subclasses without requiring cross-reference copies (see also section 714).

### 309 *Patent Assignment Between Generic Subclass and Indented Species Subclass*

The situation set forth in section 308 must be distinguished from the relationship of subclasses in which species are indented under a generic subclass. For example in a group of patents relating to springs the subclass arrangement might be as follows:

Spring  
     Coil  
     Leaf

Where a single disclosure is present there is no problem since assignment is based on claimed disclosure. For example, let it be assumed that a patent discloses a coil spring, provided for in the subclass "Coil." The claim or claims, however, do not specifically claim a coil spring or any of the structure of the coil spring, but claims the spring generically. Since the only disclosure is that of a coil spring, such patent is assigned to the subclass "Coil" on the basis of claimed disclosure and is not cross-referenced in the subclass "Spring." This is in accordance with the principle of assigning the original copy on the basis of claimed disclosure in that the genus claim comprehends or includes the variant species thereof disclosed.

However, where there are plural species disclosed, one of which is specifically provided for in an indented subclass (e.g., a coil spring)

and one which is not specifically provided for (e.g., a fluid spring), the following principle applies. If the patent contains a generic claim or claims, or a claim to the unprovided for fluid spring species, the patent is assigned to subclass "Spring" and cross-referenced to subclass "Coil." Where the claims, however are directed only to the coil spring, the patent is assigned to subclass "Coil" and optionally cross-referenced to subclass "Spring."

Thus a search for any of the species specifically provided for, is limited to the appropriate indented subclass, while a search for a species not specifically provided for is limited to the genus subclass.

Since the division of chemical compounds and compositions is generally on a genus-species relationship, the principle set forth in this section is used in almost all situations in the assignment of patents in this field.

### 310 *Assignment of Cross-Reference Copies*

As stated in section 302 subject matter disclosed is of anticipatory value and such subject matter must be available for search purposes even though not claimed or claimed in a claim other than the most comprehensive claim. The U.S. Patent Classification System provides for the placement of such subject matter in all appropriate places in the system by the expedient of cross-referencing, a topic which is presented in detail in Chapter Five, particularly section 527.

### 311 *Type of Subject Matter To Be Classified*

The subject matter pertinent to search problems for patent purposes, and contained in the disclosures of the documents to be analyzed and assigned, consists of scientific and techni-

cal information and may be defined in many ways.

The constitutional provision, article 1, section 8, states "The Congress shall have power . . . to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

The statutory provision, 35 U.S.C. 101 is "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

The constitutional provision is very broad with regards to science and the useful arts. However, the statutory provision limits these terms to a process, machine, manufacture, or composition of matter. Machine, manufacture or composition of matter are inherently directed to technological results. Process, however may be directed either to (1) a pure mental step which produces no tangible or technological result such as a pure mathematical problem, or (2) a step which does produce a tangible or technological result, such as the step performed in fabricating a molded article or the step performed to determine the structure of a subterranean formation. Under the patent statutes as interpreted by the courts, the only process included in the useful arts is—as in (2) above—the one in which a tangible or technological result is obtained. Thus, the subject matter included under the patent statute and which must be provided for in the U.S. Patent Classification System covers the technology of all scientific fields. For example, pure astronomy and pure mathematics are of no interest under the patent laws; however the technology of these scientific fields is of interest (e.g., the telescope, spectrograph, computer, etc.).

### 312 *Categories of Subject Matter*

As indicated above a classification system suitable to the needs of the patent profession must therefore provide for processes, machines, manufactures and compositions of matter.

### 313 *Processes*

Processes may be separated into two categories, (1) manufacturing and (2) non-manufacturing.

### 314 *Manufacturing Process*

A process of manufacture is a process which when practiced will result in some type of product being made. Processes of manufacture are many and diverse. It is quite common in connection with a disclosure directed primarily to a manufactured product to describe at least in broad and general terms the process used in its production. Relative to many products, the mere disclosure of the characteristics of that product will make many modes of manufacture obvious to those skilled in that product art. Under these circumstances, the disclosure of the process of manufacture is often either omitted altogether or set forth only in the most general terms. Where, however, the production of a disclosed and claimed product is not obvious, under the U.S. patent laws there must be a detailed disclosure of a process for making it. Thus a great many disclosures of products will also contain a disclosure of a process of manufacture. Conversely, where a disclosure is directed primarily to a process of manufacture, there is usually a disclosure of a product made. It is common practice also to disclose some form of apparatus to practice the process.

### 315 *Nonmanufacturing Process*

A non-manufacturing process is a process which when practiced does not result in a product being made, but rather produces only an effect, (e.g., a process of pumping, a turbo-generating process, or a process of communication).

### 316 *Machines, Manufactures, and Compositions of Matter*

The statutory categories, machines, manufactures, and compositions of matter all involve devices or products. These devices and products can be separated into three types: (1) a product to be used or to be consumed (2) an apparatus for making a product and (3) an intermediate material used in making a product.

### 317 *Product*

This term covers a multitude of very diverse and distinct subjects of invention. Substantially every existing class has classified therein one or more types of manufactured product. Everything made by man is a manufactured product. A manufacturing machine is itself a manufactured product. A composition of matter or stock material to be used in a manufacturing process for making some final product, is a product; an apparatus for practicing a nonmanufacturing process is also a product. A compound or composition of matter may be a final product in and of itself (e.g. medicines, lubricating oil, etc.).

### 318 *Apparatus for Making a Product*

An apparatus for making a product usually consists of a machine or tool which is used in a particular way to make a product. Where an

apparatus is a highly specialized apparatus capable of making but a single character of product, there is frequently a disclosure of that product. Where an apparatus is of a type for performing an operation useful in connection with making different products, there is rarely a disclosure of any particular product.

### 319 *Material Used in Process To Make Product*

Stock material and blanks which require further manufacturing operations as well as compounds and compositions which must be further combined to make a final useful product are both considered materials used in a process to make a product. These are considered as intermediate products of manufacture. Patents directed to compounds, compositions, stock, and blanks, usually include a disclosure of their process of manufacture. There is also frequently a disclosure of the process of operating upon such material to produce a final product and, at times, a disclosure of either the apparatus for making the same or apparatus for operating upon the same to produce a final product.

These materials are for the most part: (a) chemical compounds, for example, as provided for in the general class of Chemistry, or in the class of Chemistry, Carbon Compounds; (b) compositions of matter, for example, as provided for in the classes of Compositions; (c) stock material and blanks, for example, as provided for in the class of Stock Material and Miscellaneous Articles.

### 320 *Relationship Among Categories*

As pointed out above the subject matter of invention as provided for in the statute and for which the classification system must provide is separated into five categories as follows: (a)

process of using a product or apparatus (manufacturing or nonmanufacturing), (b) process of making a product or apparatus (manufacturing process), (c) product, (d) apparatus for making product and (e) materials used in process to make product.

A particular category of subject matter under one set of circumstances may become a different category under a different set of circumstances, for example, a material, category (e) used in a manufacturing process to make a manufactured product is, itself, in most instances a manufactured product which in turn, has its own process of manufacture. Also category (d), apparatus to practice a manufacturing process, is itself a product of some manufacturing process.

The following is given as an illustration of the immediately preceding statement, the letter at the left of each subject identifying the category in each situation. As shown, material [category (e)] which is the last subject of each group when related to the other subjects in that group, becomes a final product, [category (c)] in the following group when related to the subjects in that group.

In considering the following illustration, it is noted that a turbine blade assembly is a product (c) used for practicing a nonmanufacturing process (a), namely, a process for generating mechanical power requiring the use of a turbine.

Relative to the process of assembling the same, the turbine blade assembly is again a product (c), made by a process (b), using a jig (d), the blade (e) being an intermediate, used in a process of assembling.

The blade (c) in the next group becomes a product (c) made in accordance with a forging process (b), requiring an apparatus (d), for its practice and utilizing a blank (e).

The blank (e) then becomes a product (c) relative to a process (b) of cutting sheet metal

<i>Type</i>	<i>Subject</i>	<i>Type</i>	<i>Subject</i>
(a)	Turbo-power generating process	(c)	Turbine blade assembly
(c)	Turbine blade assembly	(b)	Process of assembling
		(d)	Jig for assembling
		(e)	Blade
(c)	Blade		
(b)	Process of forging	(c)	Blank
(d)	Apparatus for forging	(b)	Process of cutting
(e)	Blank	(d)	Apparatus for cutting
		(e)	Sheet metal (stock)
(c)	Sheet metal (stock)		
(b)	Process of rolling	(c)	Alloy
(d)	Apparatus for rolling	(b)	Process of making
(e)	Alloy	(d)	Apparatus for making

to produce a blank, utilizing apparatus (d) for its practice, and the sheet metal used is the stock (e) from which the blank is cut.

In the next group, the sheet stock becomes a product (c) made by a process of rolling (b) using metal rolling apparatus (d) and an alloy as the composition (e) from which the sheet stock is made.

The alloy in turn becomes a product (c) made by a process (b) of the class Metallurgy which utilized an apparatus (d) from the class of Metallurgical Apparatus.

### 321 *Combination, Subcombination*

Since each of the preceding categories in every technological field involves a combination made up of two or more subcombinations, each disclosure must be analyzed for the total combination disclosed, for the most comprehensive combination claimed, as well as for each separately claimed part thereof, and for each novel subcombination disclosed. The concepts of combination and subcombination then can be considered as characteristics of scientific and technical subject matter and a discussion of the meaning of these concepts as they relate to the U.S. Patent Classification

System, and how they are applied in the development of this systems follows:

Primarily, the product of scientific research or technological development results from the fact that a scientist or development engineer has brought two or more factors into conjunction for the purpose of obtaining some result. The written product of research or development is made up of a number of information factors or units disclosed in combination, setting forth the relation therebetween and the result thereof.

Thus the following terms, in common use in connection with inventions that may be patentable, need consideration.

<i>Term</i>	<i>Meaning</i>
Combination-----	the whole
Subcombination-----	less than the whole

The term "combination" is used to denote the whole, that is, the assemblage of two or more parts together to form a whole. Its meaning in connection with patents and patent applications is determined by the totality of the disclosure or by the most comprehensive claim. Combinations are distinguished not only by the parts that are used together but by the relationships among such parts. More frequently than not, the parts themselves are individually old. In a large number of in-

stances not only are the parts individually old but they may have been used in combination with each other before in a different relationship.

The term "subcombination" is used to denote any part of the disclosure or of the most comprehensive claim less than the whole.

These terms are relative terms, whose meaning must be determined by the context of the subject under consideration. Thus in considering the meaning of these terms it is always necessary to identify a base of reference. The scope or comprehensiveness of the combination must be determined by the text of the disclosure and the limitations of the claim. By using this as a base of reference, any portion less than that which is disclosed or claimed is a subcombination.

### 322 *Classified in Same or Separate Class*

A question often arises during the reclassification of a body of subject matter as to whether subject matter relating to a combination and subject matter relating to a subcombination thereof should be classified in the same or in separate classes. The general principle to be followed is simple. Subcombinations specialized to a particular combination are classified in the same class as the particular combination. Where a subcombination can be shown to have utility in two or more combinations provided for in different classes, a classification should be created so that a separate class provides for that character of subcombination. A consideration of substantially any class will show that it has one or more subclasses devoted to subcombinations determined as being specialized to the combination of that class; for example, (1) the class of Apparel provides for specialized subcombi-

nations of garment supporters and for specialized subcombinations of garments in general and (2) the class of Valves and Valve Actuation provides for specialized subcombinations of valve structures, such as valve seats and valve bodies. A consideration of the general class of Machine Elements and Mechanisms and a comparison thereof with various machine classes is an example of subcombinations of general utility collected together in a special class therefor.

### 323 *Subject Matter of a Class*

Each class in the U.S. Patent Classification System is made up of a particular segment of the entire mass of scientific and technical subject matter which constitutes the whole system. The particular segment which forms a given class consists of combinations, or subcombinations, of the subject matter within one or more of the categories of subject matter. Such segment is separated from the mass on the basis of some proximate function, effect or product or in rare instances on the basis of structure as pointed out in the preceding chapter. The segment for each class includes a nucleus of subject matter, called "basic subject matter," which is constituted by those features essential to some fundamental or proximate utility upon which the class is based. This involves a minimum number of features necessary to distinguish that class from all other classes. For purposes of further discussion, basic subject matter will be denoted by the symbol "A".

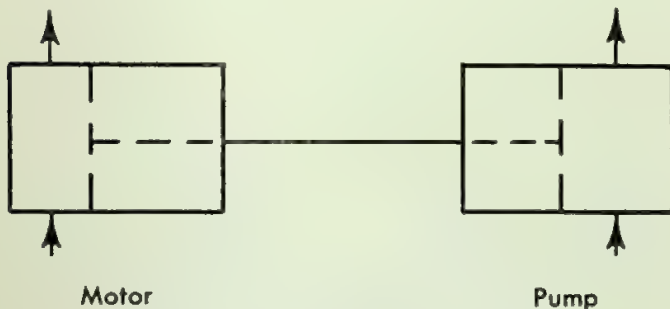
### 324 *Determination of Basic Subject Matter*

Analysis for the purpose of determining the basic subject matter of a particular class in-

volves a comparison of prior art disclosures with each other.

Only by such intercomparison, made with full understanding of both the pertinent patent law and the scientific, engineering and technical principles of the technological fields involved, can a proper determination be made as to the features that constitute the basic subject matter sufficient to distinguish a class from all other classes.

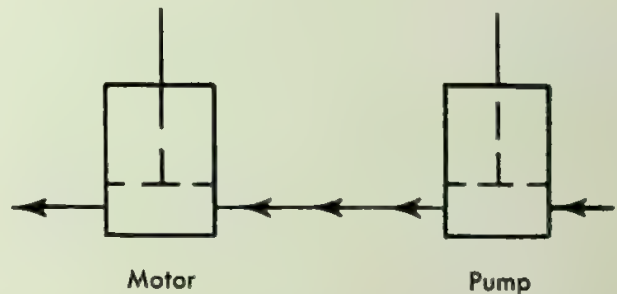
The features of the basic subject matter of any class that serve to distinguish such class from all other classes are the features unique thereto. Features, properties or relationships common to many classes, or accidental qualities that may be associated with or omitted from the unique features without affecting them, can never serve to properly distinguish the basic subject matter of one class from that of another.



A motor so related to a pump that the power output of the motor operates the pump, is basic subject matter for the class of Pumps.

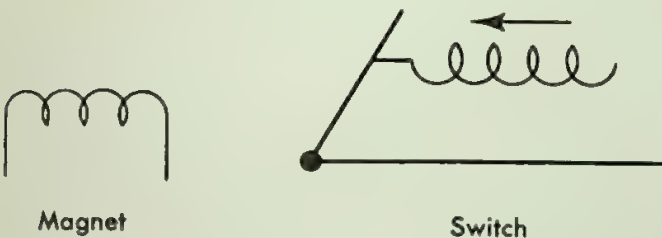
### 325 *Differently Related Subcombinations Form Diverse Basic Subject Matter*

The same two or more subcombinations may often be combined in such different relationship to each other as to comprise basic subject matter for separate classes. This is because the more elementary subcombinations of subject matter, whether process, apparatus, product or material, may have utility in many basic subject matter, and also because the same elementary subcombinations may be associated together in different ways to form combinations entirely different from each other. A consideration of any broad technological field will demonstrate this fact. All of the highly diverse machine arts are formed by selections of the same machine elements which are then differently related, for example:



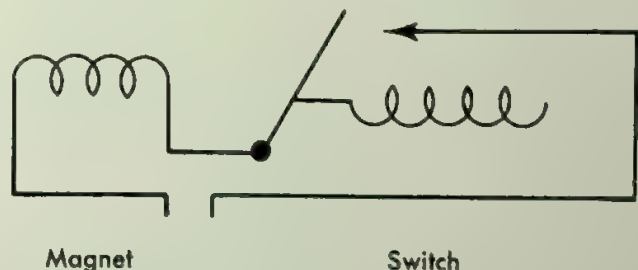
A motor so related to a pump that the fluid under pressure discharged from the pump operates the motor, is basic subject matter for the class of Power Plants.

Many electrical system classes are made up by selections of a relatively few types of elec-



An electromagnet so related to a switch as to form a relay, is basic subject matter for the class of Electricity, Circuit Makers and Breakers.

trical elements which are then differently related, for example:



An electromagnet so related to a switch as to form a motor is basic subject matter for the class of Electrical Generator or Motor Structure.

Subcombinations of a basic subject matter should in their turn be treated on the same basis. If a comparison of a subcombination with others most nearly similar, shows that there are features or relations that specializes the subcombination to a particular basic subject matter, then association should be therewith. If a comparison shows that the features and relations therebetween are of more general utility, that is by themselves or in other and different combinations, then association should be with such other most nearly similar subcombinations, which in turn must be analyzed to determine the features and relations unique and thus basic thereto. This involves a tremendous task requiring a Classifier to take the following steps: (1) acquire a knowledge of subject matter related to the area under consideration in the whole system; (2) scan all pertinent disclosures in an area of the whole system to obtain full comprehension of such area; (3) carefully define a segment within the area which is to be the basic subject matter of a single class in the whole system; (4) prepare notes stating the exact relationships of this single class to other classes, especially those bordering on the basic subject matter of the defined segment.

### 326 *Hierarchy of Subject Matter*

In general, experience has shown that in attempting to define the basic subject matter of a class in the U.S. Patent Classification System, assembling subject matter on the basis of the following broad groups has resulted in best bringing together closely related subject matter.

- (1) Chemical subject matter.
- (2) Electrical subject matter.
- (3) Dynamic subject matter, that is relating to moving devices or combinations of relatively movable parts.

- (4) Static subject matter, that is stationary devices or non-movably related parts.

### 327 *With Combined Feature: Subcombination*

Once having determined the basic subject matter for a particular class, represented by "A", all that can be added thereto are combined features comprising the basic subject matter of a different class, either (1) having a different proximate function, effect or product than that of the basic subject matter A, so that the combination involves the proximate functions, effects or products of each, or (2) which do not change the proximate function, effect or product of basic subject matter A, but merely perfect it for its intended purpose. For purposes of discussion and diagraming such different features as in (1) will be designated as "B", and the combined "AB" (e.g., refrigeration means plus cutter for frozen product), and such perfecting features as in (2) will be designated as "p", and the combination "Ap" (e.g., vehicle plus electric light).

Subject matter which constitutes less than the basic subject matter and therefore falls short of the proximate function, effect or product, of the basic subject matter for a class, but constitute parts or portions thereof, are subcombinations or elements. For purposes of discussion and diagraming such features will be designated as "X" (e.g., wheels of a vehicle).

These terms are relative and often involve an exercise of judgment on the part of the Classifier. If the basic subject matter is taken to be electrical systems of operation and control of electric motors, electric motors structure is a subcombination or element X of the basic subject matter. Where, however, the basic subject matter is the electric motor structure, a system of operation and control combined therewith would constitute an Ap combina-

tion, A being the electric motor structure and p being the system of operation and control therefor.

Further, the terms involve relations of combination and subcombination. A and B are each subcombinations of the combination AB. For example, an apparatus for performing several operations such as coating a strip of material and subsequently cutting the strip into sections is an AB combination, in which the coating portion A and the cutting portion B are subcombinations of the combination AB.

Similarly A and p are each subcombinations of Ap. For example, a coating device combined with means to heat the coating material to facilitate the coating operation is an Ap combination. In this situation the coating feature A and the heating feature p are subcombinations of Ap.

X is a subcombination or element of the basic subject matter A, and in turn may be a combination of more elementary subcombinations. For example, a coating roller which forms part of a coating apparatus is a subcombination or element of such apparatus. Such roller could itself be made in sections and provided with detachable axles, in which case the roller would be a combination and the various sections and the axle would be elements or subcombinations of such roller.

### 328 *Classification of Each Character of Subject Matter*

It is axiomatic that the basic subject matter of a class should always be classified in that class; however, the question arises as to whether the combinations AB, Ap and the subcombination or element X should be classified in the same class with basic subject matter A or in some other class. As to the combinations AB, and Ap and the subcombination or element X, the following principles generally apply.

### 329 *With Features for Different Function*

The combination AB, consisting of the basic subject matter A and basic subject matter B, may be classified either (1) in the class providing for basic subject matter A, or the class providing for the basic subject matter B, or (2), in a third class AB.

(1) To determine whether the combination AB, should be classified in the class providing for subject matter A, or in the class providing for subject matter B, the following criteria should be considered:

(a) When the separate subcombinations are classified in classes providing for subject matter of two or more of the separate groups set out in the hierarchy of subject matter of section 326, the combination is assigned to the class which provides for subject matter of the group which appears higher.

(b) When the separate subcombinations are classified in classes providing for subject matter of a single group set out in the hierarchy of section 326, the following factors are considered for assigning the combination:

1. The locus of the greater number of patents directed to the combination AB, either with the subject matter A of the first class or with the subject matter B of the second class.

2. The exigencies of the situation—e.g., manpower or time limitations may require that a reclassification project be limited so that it would be impossible to clear the class providing for basic subject matter B of the AB combinations, therefore, all such combinations found during reclassification of the class providing for the basic subject matter A would be placed in Class B.

3. The time available—where sufficient time is available to analyse all patents from whatever source for the combinations AB, and after such analysis, the Classifier can determine where, in his best judgment, the combination AB, should be classified to establish the best search fields for such combinations.

(2) In some circumstances the subject matter AB may best be provided for in a class other than either the class providing for basic subject matter A or the class providing for basic subject matter B, in which case subject matter AB usually constitutes the basic subject matter of such class. The only criterion for creating such a class is the amount of subject matter AB involved. If sufficient numbers of documents relating to such subject matter are involved to form the basis of a separate class, then such class should be created. An example of this type of class is the class of Motor Vehicles (AB) which provides for the combination of an internal combustion engine (A), classifiable in the class of Internal Combustion Engines and a land vehicle (B), classifiable in the class of Land Vehicles.

### 330 *With Perfecting Features*

The combination of the basic subject matter with perfecting features (Ap) is classified in the class having basic subject matter (A) as shown by the following examples:

The class of Boring Or Penetrating The Earth, has subclasses therein as follows:

- With heating or cooling (1) within the bore or (2) drilling fluid.
- With bit wear signal generating.
- With signalling, indicating, testing, or measuring.

The basic subject matter consists of an apparatus for making a hole in the earth. The

features added to the basic subject matter as expressed by the above subclasses do not change or add to the proximate function of the class. The combination still has that sole function, but the added subject matter causes the proximate functions of basic subject matter (A) to be carried out more perfectly or conveniently.

The class of Coating: Processes and Miscellaneous Products, has a subclass therein as follows:

With preparatory treatment of the base

The basic subject matter in this second example is constituted by the prior operations necessary to apply a coating material to a base member. The added operations of the noted subclass again do not change or add to the proximate function of the class. The combination still has that sole function but the added subject matter causes the proximate function of the basic subject matter (A) to be carried out more conveniently or efficiently.

### 331 *Subcombination or Element*

As stated in section 327, a subcombination or element X is a part of the basic subject matter less than the whole and the principle set forth in section 322 that a subcombination limited for use in a particular combination is classified in the combination class, while a subcombination not so limited is classifiable in a class of more general utility is applicable. This is illustrated by the following example: The combination of a valve and actuating means therefor includes as elements or subcombinations thereof a valve seat, a valve body are subcombinations or elements limited for operating the linkage. The valve seat and body are subcombinations or elements limited for use in a valve combination, therefore these

I. Basic Subject Matter A

II. With features for different function AB

III. With perfecting feature Ap

IV. Subcombination or Element X

In the class providing for basic subject matter A

In the class providing for basic subject matter A or in the class providing for basic subject matter B or in a third class AB

In the class providing for basic subject matter

In the class providing for basic subject matter A or in class taking type of X

subcombinations are provided for in the class of Valves and Valve Actuation, which has subclasses called valve seats and valve body. The actuating linkage and handle however may have applications in other combinations and therefore are provided for in a general class of Machine Elements and Mechanisms, which provides for mechanical movements per se, even though disclosed as being a valve actuating means.

### 332 *Summary Chart*

The above chart serves to illustrate the presentation of sections 323–331. The chart shows in the left hand column, the four characters of subject matter common to every distinct class of technology. In the right hand column is the class in which each character of subject matter may appropriately be classified.

### 333 *Overlapping Classes*

Classes may overlap one another as follows:

(1) They may overlap because subject matter directed to the same structure for performing the same function is classified in different classes under a different name. For example: The old class of Kitchen and Table Articles included salt and pepper shakers. However dispensers for pulverulent materials which are not salt and pepper shakers are in the class of Dispensing. In-

cluded within this latter class is subject matter identical in structure to the salt and pepper shakers and also performing the same function.

(2) They may overlap because subject matter directed to the same structure but for performing a different function is classified separately in different classes under a different name. For example: The class of Textiles, Fluid Treating Apparatus had a subclass therein providing for wringer rolls per se, the function of these rolls being to squeeze liquid from textiles in a wringing operation. The old class of Coating had a subclass providing for inking rolls per se, the function of these rolls being to apply ink to type elements during a printing operation. Rolls were found in each of these classes which were substantially identical structurally, even though used to perform a different function.

Where classes overlap as in (1) above, consideration should be given to collecting the overlapping subject matter within a single class upon a basis appropriate to that subject matter. In the example given, this was done during a reclassification of the subject matter in the old class or Kitchen and Table Articles which was abolished.

Where classes overlap as in (2) above, consideration should be given to the feasibility of collecting the embodiments that are essentially the same structurally and operationally within a single class. This was done with respect to the roll example set forth above in a classification project which gathered together all such

rolls on the broad proximate function of work rolls. However, as to this character of overlapping, it sometimes occurs that a careful comparison indicates that, while the embodiments are quite similar structurally and operationally, they in fact involve characteristics that warrant their separation, even though no lines can be drawn other than the fact that they are disclosed as specialized to particular different utilities.

### 334 *Categories of Subject Matter Classified in the Same or Separate Classes*

As stated above the basic subject matter of a class generally consists of subject matter relating to plural categories of subject matter, that is nonmanufacturing process, manufacturing process, product, apparatus, or material. The question often arises during the creation and development of a classification system, or when determining the scope of the subject matter to be included within certain classes in the system, as to whether subject matter relating to various ones of the categories of subject matter should be associated in the same class or placed in separate classes.

Probably the best approach is to study the classification system as it presently exists and determine which associations and which separations have been satisfactory and which have been unsatisfactory. Since many of the existing classes include subject matter relating to two or more of the categories, these are best considered in pairs.

### 335 *Process and Product Made*

A manufacturing process and a product made thereby are associated in the same class when the process necessarily makes the product and the product can be made only by the process. The chemical compounds and com-

position classes, are examples of this type. The class of Textiles, Weaving, also has both the weaving process and the resultant woven textile.

Where, however, a process can make numerous products or the product can be made by various processes, the process and product are ordinarily classified in different classes. A consideration of the class of Metallic Receptacles, will illustrate this point. Metallic receptacles can be made, among other ways, by casting provided for in the class of Metal Founding, or by sheet metal working provided for in the class of Sheet-Metal Ware, Making. In a large number of instances the disclosures relative to metallic receptacles do not contain any suggestion as to the process of making the same. Thus it would be impossible to associate a large number of these disclosures with any particular process. The disclosures of the receptacle structure, for the most part, have more features in common with each other than they have with any particular disclosed process of manufacture.

### 336 *Apparatus and Product Made*

Manufacturing apparatus and a product that can be made thereby are ordinarily so distinct as to warrant separate classification. An exception exists in those instances where a product and the process of making it require classification together which then, due to the relationship between the process and an apparatus for its practice, result in these three categories being classified in the same class. The class of Textiles, Weaving is an example.

### 337 *Process and Apparatus for Its Practice*

Where a process requires a particular type of apparatus for its practice, which apparatus, in its necessary or basic function, will in-

evitably practice the process, they are usually classified in the same class. The class of Textiles, Weaving, which provides for apparatus and process, is an example of this situation. Another example is found in the class of Solid Material Comminution or Disintegration.

Where, however, a process can be practiced by various types of apparatus or an apparatus can be used to practice various types of processes, classification of these two categories has been in separate classes. For example, apparatus, even though restricted by disclosure to particular chemical procedures, will ordinarily function in several of the many chemical fields for which separate classes are provided.

Other special considerations sometimes warrant the separation of process and apparatus for its practice. In the class of Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers it was determined that processes of bleaching of any material, processes of dyeing any material, and processes for treating textiles and fibers with fluids and chemicals either to clean the same or chemically modify the same should be associated together. A comparison of these several subjects indicated a sufficient community of ideas to warrant placing them in a single class. This association of various types of processes apparently hindered the classifying of apparatus for practicing such processes in the same class with such processes. This apparatus for practicing processes classifiable in the above mentioned class is found in different classes; for example, the class of Textiles, Fluid Treating Apparatus and the class of Cleaning and Liquid Contact With Solids.

The class of Textiles, Fluid Treating Apparatus has apparatus specialized for use in treating textiles and fibers with fluids and chemicals.

The class of Cleaning and Liquid Contact With Solids has apparatus for treating materials other than textiles with liquids, includ-

ing liquid chemicals to practice the processes of the class of Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers so long as the means provided for in the class of Brushing, Scrubbing and General Cleaning are not used. It is noted that the class of Cleaning and Liquid Contact with Solids also has processes for cleaning of nontextile materials or for treating nontextiles for purposes other than bleaching or dyeing. Relative to this group of classes, it was found that a process and an apparatus for its practice should be in different classes.

### 338 *Process and Material Used*

In some instances the material used in a process is classified with the process; for example, in the class of Bleaching and Dyeing, Fluid Treatment and Chemical Modification of Textiles and Fibers, dye compositions are classified with dyeing processes.

In other instances the material used in a process is classified in a different class from the process. The class of Coating: Processes and Miscellaneous Products has coating processes, while the class of Compositions, Coating or Plastic and other composition classes have coating compositions. It was found in the case of coating compositions that such compositions were more closely allied to plastic compositions incapable of use in a coating process but having ingredients similar to coating compositions.

### 339 *Product and Material Used*

Where a material is an intermediate and the intermediate is considered as being a subcombination specialized to the combination of the product class, it is classified therein as noted above in section 322 in a discussion of combination-subcombination, but where the

intermediate is of general utility, it is classified in a separate class.

Blanks specialized to a particular product are ordinarily in the class with the product. However stock material and compositions which are ordinarily usable in connection with the making of numerous different products are ordinarily classified separately from any one of the products. For example, compositions are classified in any of the composition classes while stock material is classified in the class of Stock Material and Miscellaneous Articles.

It may thus be concluded that the various categories are sometimes associated in the same class and sometimes not, depending on the particular circumstances in each case as determined by an analysis of the subject matter and applying the general criteria set forth above.

### 340 *Summary of Principles Relating to the Analysis of Scientific and Technical Subject Matter and Subdivision of Such Subject Matter*

#### ANALYSIS AS A PREREQUISITE TO SYSTEM DEVELOPMENT

The U.S. Patent Classification System is created by analysing the disclosures of U.S. patents and then creating classes (including the schedule of subclasses within each class) by grouping together like subject matter as represented in the disclosures of such patents.

#### PATENTS GROUPED BY CLAIMED DISCLOSURE

Inasmuch as nearly every U.S. patent contains disclosure that is claimed and also disclosure that is not claimed, the general principle is that a classification system is created and a patent shall be assigned therein on the basis of that portion of the disclosure covered by the claims rather than on a portion of the disclo-

sure that is not claimed. A disclosure that is not claimed is one that may form an element or step of a claimed combination as well as a disclosure not referred to in any claim.

#### PATENTS DIAGNOSED BY MOST COMPREHENSIVE CLAIM

The totality of a claimed disclosure must be selected, whenever possible, in creating a classification system and determining the appropriate class to which a patent is assigned, but a mere difference in the scope or breadth of claims should not make a difference in assignment.

#### EXCEPTIONS TO CLAIMED DISCLOSURE PRINCIPLE FOR ASSIGNING PATENTS TO SPECIFIC CLASS

The following situations are exceptions to the principle that a system is created and the patents assigned therein on the claimed disclosure of U.S. patents. When these exceptions are applied, the class definitions of the classes involved should clearly so state.

##### A. *Old Combination with Specific Subcombination*

Where a patent claims a specific subcombination with some other broadly recited subcombination, the combination and subcombination being classified in different classes, there are exceptions to the general principle that a classification system is created and a patent is assigned therein on the basis of the claimed disclosure; that is, the patent may be assigned to the subcombination class where the following conditions apply:

- (1) A relatively large number of patents are involved.
- (2) The combination is old as a matter of common knowledge.
- (3) No new relationship between the elements is set forth.
- (4) The other elements are nominally claimed.

*B. Article defined by material from which it is made*

A patent for an article of manufacture, claimed by name only and in which the claim is otherwise directed to a specific material of which the article is made, is generally assigned to a class providing for material rather than a class providing for the article.

*C. Process of utilizing a composition*

A patent claiming a process of utilizing a specifically defined composition may be assigned to the composition class where the process steps are nominally recited and the

composition class provides specifically for compositions having that use.

EXCEPTION TO CLAIMED DISCLOSURE  
PRINCIPLE FOR PATENT ASSIGNMENT  
BETWEEN SUBCOMBINATION SUBCLASS AND  
INDENTED COMBINATION SUBCLASS

Where a parent subclass has indented thereunder a combination subclass which includes as a subcombination thereof the subject matter of the parent subclass, a patent disclosing the subject matter of the combination subclass but claiming only the subject matter of the subcombination subclass is assigned to the indented combination subclass.



## *Creating a Single Class*

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*Sections:*

- 400 Fundamental Considerations
- 401 Infinitude of Possible Combinations
- 402 Difficulty of Having a Subclass Corresponding to Every Combination
- 403 Subdivision and Arrangement
- 404 Descending Order of Complexity or Importance
- 405 Superiority Among Coordinate Subclasses
- 406 Exhaustive Nature of Coordinate Subclasses
- 407 Indentation in a Single Class Schedule
- 408 Group Together Subclasses of an Unnamed Genus
- 409 Advantages of a Hierarchical Arrangement of Subclasses
- 410 Types of Subclasses
- 411 AB and Ap Combinations and the Miscellaneous Combined Subclass
- 412 Subclass That May be Either AB or Ap
- 413 Other Subclasses Usually Placed Above Combined
- 414 Title "Special" Not Proper
- 415 Categories of Special Subclasses
- 416 Subclasses Based on Ultimate or Remote Function
- 417 Subclasses Directed to a Feature Which May be of a Different Class or Basic Subject Matter
- 418 Basic Subject Matter Having Unique AB or Ap Combination
- 419 Subclasses Directed to Relatively Important Subject Matter
- 420 Condition Responsive Control
- 421 Control Must be For Some Operating Portion of the Apparatus Other Than a Signal or Indicator
- 422 Cyclic Operation Not Condition Responsive Control
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- 424 Automatic Control
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*Sections:*

- 426 Every Class Should Provide For Automatic Control if Possible
- 427 Subdividing Automatic Control Subject Matter
- 428 Position of Condition Responsive Control and Automatic Control Subclasses in a Schedule
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- 430 Subclasses Relating to Measuring, Testing, Signalling, Indicating, Etc.
- 431 Convertible
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- 461 Categories of Subject Matter in the Same or Separate Subclasses
- 462 Product and Apparatus for Making the Product
- 463 Product and a Process of Making the Product
- 464 Process and Apparatus for Its Practice
- 465 Compositions, Stock, Blanks or Intermediate Products
- 466 Superiority of Arrangement of Different Categories of Subject Matter
- 467 Summary of Principles Relating to Creating a Single Class

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## 400 *Fundamental Considerations*

Previous chapters have dealt with the bases on which the Patent Office classification system is created. Also considered have been main categories of subject matter and various principles concerning the grouping of the subject matter into classes or large groups.

This chapter is directed to the subdivision and arrangement of subject matter contained in a group of patents determined to constitute a single class. Subdivision means dividing the subject matter into subclasses and arrangement comprises placing the subclasses into a logical scheme or schedule. In the U.S. Patent Classification System, subdivision and arrangement are indivisible components of a single operation. Subclasses have significance in the context of the total class organization. Mere subdivision of subject matter to be classified into a number of subclasses is satisfactory only to the extent that the subclasses may be arranged into a logical scheme. The mere formation of individual subclasses, on however good a basis, is not complete classification unless these subclasses are arranged in some definite understandable relation to one another and numbered and titled in a schedule to represent the relationship. Furthermore,

unless the position of each subclass with respect to every other subclass containing related subject matter is apparent, such related subject matter could only be found by investigating every subclass in the class. Each subclass is in effect a locus for similar subject matter. When each subclass is properly labeled, a searcher can ultimately locate those subclasses that contain the subject matter he is seeking once he learns or recognizes the titles that have been applied to those subclasses. If, for example, the subclass titles are arranged in alphabetical order he may find all related subject matter when he knows the specific title of every subclass providing for such related subject matter even though very similar things may bear names as far apart as A and Z. But when all subclasses in a schedule having related subject matter are placed adjacent one another, the resemblances lessening in proportion to the separation, a search for related subject matter can be limited to a specified or restricted area of that schedule. Further, when a broad or generic title is assigned to each group of related subclasses—though individual subclasses may have different names they may be similar with respect to the searched-for characteristic—the problem of locating the specific desired search area is lessened.

#### 401 *Infinitude of Possible Combinations*

There are now over 3 million U.S. patents alone, each presumptively covering subject matter that is novel. Most of these patents in addition disclose a plurality of means or acts. Each of these patented means or acts is potentially an element of a more complex combination that may be patented. When one considers merely the number of forms of energy, the number of known substances and known mechanical elements, and then attempts to determine all possible combinations and permutations, it becomes apparent that the resulting number of possibilities can never be known. Calculations for the possible combinations and permutations of a small number of objects are common. Different combinations of the letters of the alphabet are sufficient to record the sum of human knowledge in many languages. Thirty metals may be combined into 435 binary alloys, 4,060 ternary alloys, 27,405 quaternary alloys. This does not take into consideration differences in proportion of ingredients which is of utmost importance in obtaining desired results in processes for making compounds and compositions. The total number of possible alloys of the known metals is incomprehensible.

The classification systems for some of the natural sciences are well developed and furnish excellent examples of scientific classifications. The classifications of Zoology, Botany, and Mineralogy are among the best available models of logical division and systematic and analytical arrangement. The most casual consideration of these classification systems, however, renders apparent the relative simplicity of the task of classifying natural objects differentiated by natural laws as compared with the task of classifying the products of creative and imaginative faculties comprising patentable subject matter. Zoological classification does not have to classify combinations of birds, fishes, reptiles, and mammals. The chimera

and other animal monsters occur only as figments of the mind, further, the question of absolute numbers of instances is not of any importance to such a classification system, all of the members of a species being alike for classification purposes.

However, patentable subject matter differs from such natural objects in that generally any means may be combined with some other means or any part with some other part. Organizations may be parts of some other organizations, or even mutually parts of each other, as, for example, a pump may be a part of a lubricator, or a lubricator may be a part of a pump. Some parts are peculiar to one means, some are common to many. Every member of a species differs from every other member. Added to this, the intellectual differences among those who prepare patent applications—for example: the differences in their generalizing powers, the relatively broad and narrow views of two or more persons presenting the same invention (variations not indulged in by nature)—complicate the problem of classifying the disclosures of the prior art.

#### 402 *Difficulty of Having a Subclass Corresponding to Every Combination*

In any class there are always a number of characteristics for which it may be desirable to provide a subclass. However, space and the perceptive faculties—and expediency—make it impossible to provide a separate subclass for each possible combination of a large number of combinable characteristics. As a simple illustration, the imaginary classification of books for use by a book seller may be considered. The seller has books on (1) four subjects, history, science, art, and fiction, (2) each printed in four languages, English, German, French, Spanish, (3) each in four sizes of page, folio, quarto, actavo, duodecimo and

(4) each bound in four materials, leather, rawhide, cloth, paper. Here are four main characteristics, each in four varieties. A customer is likely to ask for *Ivanhoe* in English octavo, bound in leather. If the book seller had arranged the books into one class according to subject matter, into another according to language, another according to size and another according to binding, he would not be able to find a subdivision specifically providing for all four characteristics because his classes would be formed on four different bases each of which corresponds to one of the desired characteristics but none including all four. Some histories would be in French, some would have octavo pages, and some cloth bindings. But if he had divided first on the basis of subject matter, then each subject matter into language, each language book into sizes, each size into material of binding, he could immediately locate a subdivision providing for all four characteristics. This classification, however, based on 4 different characteristics and 4 varieties of each, would necessitate the formation of 256 subdivisions, and if 5 characteristics had to be provided for, 1,024 subdivisions would be required, thereby rendering the system cumbersome.

An attempt to adapt the book illustration set forth above to the Patent Office classification system results in insurmountable difficulties. Assume it possible to view these characteristics as patentable in combinations of all or in any combinations less than all, and also as separate characteristics, then 17 subdivisions additional to the 256 for each independent characteristic would have to be provided, as well as other divisions for combinations of less than the whole, in order to make the classification system absolutely indicative of every feature, thereby making the number of subdivisions enormous. In such a classification system a complete search would be ended after

one appropriate subdivision had been located, once the difficulty of locating the appropriate subdivision had been overcome.

### 403 *Subdivision and Arrangement*

Thus, it is impractical to establish separate subclasses for each of the infinite numbers of possible disclosures in the subject matter of a class. Further, the subclasses that are created must be arranged in some logical pattern to facilitate and shorten the search for a specific item.

To illustrate by analogy how the Classifier may best solve the problems of subdivision and arrangement, consider the following illustration which presents problems similar to those faced by the U.S. Patent Office in classifying patentable subject matter. The illustration deals with physical objects rather than concepts in documents; however, the analogy is adequate for a simple illustration.

Let it be assumed that the objects in a heap of metal scrap are to be classified. On inspecting the objects of the heap it is noticed that there are a large number of metal balls; some have holes through them, some are hollow, some are smooth on the outside, and some are hollow, smooth, and perforated, but they are all nevertheless balls. Accordingly all balls can be separated out and placed in a separate pile. Next, the presence of bars in the heap is observed; some long, some short, some straight, some twisted, some of round stock, some of square stock, etc. These may be gathered together and placed in a separate pile. It is further observed that there are many differently shaped annular bodies in the heap resembling generally the single links of a chain; some circular, some elliptical, some twisted, some made of round stock, some of square stock, etc. They are all nevertheless annular bodies. These may be placed in a separate pile. It is further observed that

there are a number of dissimilar single elements other than balls, bars, or annular bodies remaining in the heap. These dissimilar single elements are separated out into a separate pile of miscellaneous single objects of various forms. It is further observed that there are many objects made up of different combinations; some are combinations of links, some of a ball and link, some of a bar and link, some of a bar, link, and ball, etc. These objects may be separated from the heap on the basis of similar combinations and placed in separate piles.

On inspection of all the various piles and the miscellaneous pile it may become apparent that a particular kind of object having a special characteristic or unique use or function is present in various of the piles. All the objects having this particular characteristic are removed and placed in a separate pile. For example, if it had been desired to separate animal drags, such animal drags being particular adaptations of bars, links, balls, and miscellaneous elements, a pile may be established for this subject matter.

There are now separate piles for each distinct type of objects and a title may be chosen, to denote each pile in accordance with the character of the objects in each. The titles are arranged into a list, with the title representing the greatest combination of characteristics appearing in the highest position in the list, that is, items that are more complex appearing in the list ahead of items less complex. Also, the special use devices precede the general use devices.

The list thus becomes:

Animal drag	Chain
Bar, link, and ball	Link
Bar and ball	Bar
Link and ball	Ball

The same process may be applied in subdividing the objects in each of the piles. Thus, the pile of balls in the above illustration may

be subdivided into separate piles. For example separate piles might be established for hollow balls, perforated balls, and grooved balls with the remainder of the original pile consisting of balls not having these characteristics. A title is chosen for each pile, the titles are arranged and added to the list with the title of the variants indented under the title "Ball", as follows:

Ball
Perforated
Hollow
Grooved

The title "Ball" in this arrangement becomes thereby the title for the pile representing varieties of balls other than those indented thereunder.

There now remains a pile not provided for in the list, the pile containing miscellaneous single objects. A title "Miscellaneous" is chosen to denote the pile of miscellaneous single objects and this title is added to the bottom of the list. This title provides a depository for all subject matter not specifically provided for in any title of the list. A number may be assigned to each title for easy designation and identification and the same number assigned to each corresponding pile of objects. The list then becomes a classification schedule having a particular order and arrangement in which each title and the corresponding pile of objects represent a subclass. The schedule then becomes:

- 1 Animal drag
- 2 Bar, link, and ball
- 3 Bar and link
- 4 Bar and ball
- 5 Link and ball
- 6 Chain
- 7 Link
- 8 Bar
- 9 Ball
- 10     Perforated
- 11     Hollow
- 12     Grooved
- 13 Miscellaneous (dissimilar single objects)

Thus a schedule has been created in which each significant characteristic of the objects classified has been set forth and a miscellaneous title has been inserted in the schedule for all characteristics not specifically set forth. The titles have been arranged in a particular order and the piles and titles have been correspondingly numbered.

One searching for a particular characteristic of object may inspect the schedule, readily select the proper title, and by reference to the number resort to the proper pile for the desired object.

#### 404 *Descending Order of Complexity or Importance*

In the schedule set forth in the preceding section, the subclass titles have been set out in a particular pattern. They are not randomly grouped nor are they alphabetically listed. Rather they are arranged carefully in a specific sequence or order which relates to the particular characteristics of the subject matter to be classified. Such planned order is essential to every proper classification system and is governed by certain principles of classification logic.

In organizing a schedule, subclasses for subject matter that is more complex should ordinarily be assembled on the basis of total similarity and placed in the schedule ahead of subclasses for subject matter less complex. Also, subclasses providing for characteristics which evidence indicates to be more important for purposes of search should be provided for in subclasses that precede subclasses based on characteristics deemed less important. Since, however, no search can be deemed entirely unimportant, some characteristics deemed of lesser importance may require precedence in order to avoid their entire loss from the schedule.

Thus in a class founded on a well chosen basis bringing together subject matter bearing close resemblances, all subject matter that contains the minimum number of elements essential to produce a complete practically operative means, that is, basic subject matter, is found in subclasses that have a position somewhere following the beginning and before the last subclasses at the end of the schedule of the class. Those that are highly specialized to some particular purpose within the definition of the class stand above the basic subject matter subclasses, while those subclasses for parts and details stand below those for the basic subject matter. In the arrangement of subclasses in a class, those subclasses that are related to each other as whole and parts are arranged so that the wholes shall precede the parts. Thus, in the schedule of section 403 subclass 6 Chain, precedes subclass 8 Link, since a link may be a part of a chain. Also, subclasses defined by special use or function shall precede those defined by general use or function, as evidenced by the position of the special use subclass 1 Animal Drag.

#### 405 *Superiority Among Coordinate Subclasses*

The expression "coordinate subclasses" is used to designate all subclasses which have the same degree of indentation under the same title. For example in the schedule in section 403, subclasses 1–9 and 13 constitute one set of coordinate subclasses and subclasses 10, 11, and 12 constitute a different set of coordinate subclasses.

Among coordinate subclasses, those appearing first in a class schedule are considered to be superior to those appearing later in the schedule. Thus the position of a subclass in

a schedule establishes precedence or an order of superiority between that subclass and all other subclasses coordinate therewith appearing in the same schedule.

#### 406 *Exhaustive Nature of Coordinate Subclasses*

In applying the superiority rule within a given class, a claimed disclosure is placed in the first appearing coordinate subclass that provides for the subject matter recited in a claim. Thus in a properly arranged schedule the first appearing of a series of coordinate subclasses is exhaustive of the subject matter for which the subclass provides. Therefore no subclass, nor any subclass indented thereunder, can provide for the same subject matter of a preceding coordinate subclass.

If the above principles are strictly followed in creating a schedule and placing the documents therein, a searcher would not find a particular subject matter in any subclass appearing below a coordinate subclass (or one indented thereunder in a class schedule) which provides for such subject matter.

For example, consider the following subclasses in a class of Supports:

- 1 Stands
- 2 Adjustable vertically
- 3 Standard type
- 4 Adjustable vertically

This poor arrangement shows on its face that a subclass 4, subsequent to subclass 2 has vertically adjustable stands and one may infer that vertically adjustable features might be found in any other subclass subsequent to subclass 2. Thus a searcher will find it necessary to explore blindly through various subclasses subsequent to subclass 2 for vertically adjustable features.

By applying the principles of superiority set forth above, one of several possible proper ar-

rangements of these subclasses would result in a schedule as follows:

- 1 Stands
- 2 Adjustable vertically
- 4 Standard type
- 3 Standard type

The second arrangement brings all vertically adjustable stands together insofar as subsequent coordinate subclasses are concerned. Since the schedule on its face makes subclass 2 and indented subclass 4 exhaustive of this feature, the searcher has a feeling of assurance that it is in fact exhaustive and that a search can be confined to such subclasses and to such preceding subclasses as may have the vertical adjustment feature as a subcombination.

#### 407 *Indentation in a Single Class Schedule*

For purposes of discussion in this section and in sections 408 through 409, the expression "genus" is used to designate any grouping of subject matter whether a class or subclass which has indented thereunder subclasses directed to either true species or combinations thereof. The expression "variants" is used to denote such indented species or combination subclasses. In an indented schedule, all subclasses in the first column to the left are the main variants of the genus represented by the class title. All subclasses that are indented under another subclass are variants of the genus represented by the subclass under which they are indented—and must include all the limitations thereof. The genus subclass in turn provides for all variants not provided for in the specific variant subclasses.

Indentation properly carried out has a tendency to prevent, in the process of logical division, the fault of proceeding from a high or a broad genus directly to a too low or narrow indented variant. This fault may inadvertently separate subject matter that belongs

together. If, for example, it were desired to divide a body of patents having as subject matter the composition of balls according to material of the balls, an immediate division of balls (the broad genus) into aluminum, zinc, glass, ivory and rubber (narrow indented variants), would be improved by first mentally dividing the subject matter into mineral materials and nonmineral materials as follows:

```

Ball
  Mineral
    Nonmetallic
      Glass
      Metallic
    Aluminum
    Zinc
  Nonmineral
    Vegetable
    Rubber
    Animal
    Ivory

```

and then from this analysis providing divisions as follows:

```

Ball
  Mineral
    Glass
    Aluminum
    Zinc
  Vegetable
  Rubber
  Animal
  Ivory

```

#### 408 *Grouping Together of Subclasses of an Unnamed Genus*

However, it is evident that indention carried to its full extent with every possible genus and subgenus set out, useful as it is in keeping analogous subject matter together, would often make schedules complex and unwieldy. Nevertheless, in the generalizing process necessary in logical division and arrangement, the divisions of variants should always be mentally indented, as it were, under their broad genera.

Thus, under an unnamed genus may be arranged several variants in juxtaposition, without actually printing the name of the genus, so that the schedule above may read:

```

Ball
  Glass
  Aluminum
  Zinc
  Rubber
  Ivory

```

In such an arrangement, though relegating the genera mineral, nonmetallic, metallic, nonmineral, vegetable and animal, to the mind unaided by printed words, the different variants of the same genus may be kept together except that variants for which there is no subclass are provided for in the subclass under which the named variants are indented. Thus, the arrangements above necessitates placing in the subclass titled "Ball" all subject matter relating to copper balls, whereas indention under a broader genus titled "Metal" would have brought all metal balls together. In a finely divided classification system, printing of titles for all possible genera is not practicable; hence great care should be directed toward grouping variants according to the principles of arrangement herein outlined, noting that whenever a change of basis is made, a new genus is implied, and that subclasses for all other variants of the same genus, under whatever name, must be brought into juxtaposition as if indented under the implied genus.

Thus during the process of creating a schedule, one must constantly consider whether variants (1) may be collected under a generic subclass or (2) merely physically grouped together in the same general location in the schedule. Frequently it may be possible to provide first-line subclasses for related variants and place them close to each other in growing schedule. As a genus subclass suggests itself for these variants the variant subclasses may

then be indented thereunder thus reducing the number of first-line subclasses.

As an example of (1) above, during the classification of the class of Liquid Purification or Separation a first-line subclass, Plural Distinct Separators, was established to provide a genus for 24 indented subclasses having disclosures of combinations of plural basic subject matter ( $A_n + A_x$ , etc.); thus a searcher interested in two or more filters arranged in a particular relation need only consider this small area rather than the entire 542 subclasses of the class.

On the other hand as pointed out in (2) above it is oftentimes advisable, for the purpose of making class schedules less complex and unwieldy, to omit many genera. When this is done the subclasses which are subdivisions of the same genus should be grouped together. As an example of this, in the class of Solid Material Comminution and Disintegration, the genus directed to combinations of two or more comminutors of the same or different types, was not used, but two groups of subclasses which are variants of such genus were created and physically grouped together in the schedule, namely:

- 134+ Parallel material flow through plural comminuting zones.
- 152+ Series material flow only through plural comminuting zones.

#### 409 *Advantages of a Hierarchical Arrangement of Subclasses*

In summation of all of the above stated principles relative to a structured classification system based on a hierarchical arrangement of subclasses, it may be stated that:

(1) A uniform rule is provided, applicable to all classes, for (a) arranging subclasses for subject matter that bear the relation of whole to part before those for

subject matter that bear the relation of a part to that whole, and (b) arranging subclasses that are defined by a particular effect, product, material, or use before those that are defined by a function or an operation applicable generally to various effects, products, materials, or uses, whereby that portion of the schedule in which any disclosure belonging to any particular class should be found may be approached whether or not the searcher knows the name of the object sought or the title of the appropriate subclass.

(2) The substantial impossibility of dividing many classes exhaustively into a reasonable number of mutually exclusive or non-overlapping subclasses is compensated for, so that when the Classifier or the searcher has a disclosure to place or to find including two or more different kinds of characteristics, for each of which a subclass is provided, but no subclass for the plural characteristics, it will be known that the disclosure should be in the subclass for that characteristic which stands before the subclass for the other characteristic.

(3) Hierarchical arrangement compensates for omission of some generic titles that if included in the indented schedule would unduly lengthen the schedule to a cumbersome extent.

(4) Structured classification provides a rule for cross-referencing where there are several disclosures bearing to each other any of the relationships indicated above, cross-referencing being necessary in one direction only where the subject matter illustrated is coextensive with the subject matter claimed. This is particularly useful for U.S. patents which claim several inventions.

(5) Structured classification definitely limits the field of search for any unitary invention in any class so arranged, as no patented invention having the limitations

imposed by a unitary claim should be found in any subclass below the subclass properly defined to receive it or below those indented under it. Parts of such inventions may be found below or following this subclass in the same class if these parts are within the class definition, or in other classes if not within that definition. The unitary invention may be found in the subclass limited to it, or one of its indented subclasses and certain subclasses arranged above it adapted to receive organizations of which it may be a part.

#### 410 *Types of Subclasses*

The discussion in this chapter thus far has dealt with some fundamental and theoretical considerations involved in creating a single class. The discussions hereinafter will deal more specifically with the types of subclasses created, how the subclasses provide for the subject matter to be classified and the arrangement and relationship of such subclasses in a class schedule.

As stated in section 327, there are four characters of subject matter which may be incorporated within a class, namely A, AB, Ap, and X. "A" represents the basic subject matter of a class. "AB" represents the basic subject matter combined with subject matter having a different proximate function, effect, or product. "Ap" represents basic subject matter with a perfecting feature and "X" represents subject matter constituting a portion only of the basic subject matter. It was shown in section 330 that A and Ap are classified in the class taking basic subject matter A and that AB and X may also be classified in the class taking basic subject matter A. The discussion herein is directed to the types of subclasses providing for each of these characters of subject matter and the arrangement of such subclasses in a schedule.

The order in which the various subclasses are discussed in this chapter is not to be considered the time sequence in which the subclasses are established by the Classifier during the creative process of making a schedule. No such general sequence for creating subclasses can be given since the overall schedule develops as a result of analysis of the particular body of patents involved. During this analysis, the first patent may include subject matter for an Ap subclass, positioned in one place in the schedule, while an analysis of the second patent may include subject matter for an X subclass positioned in a completely different area of the schedule. However, for purposes of orderly presentation the types of subclasses and their position in the schedule will be discussed as follows: The various types of AB and Ap subclasses, the various types of special subclasses which may include any of the four characters of subject matter, the various types of subclasses relating to basic subject matter A and finally subclasses relating to element X.

#### 411 *AB and Ap Combinations and the Miscellaneous Combined Subclass*

The patents within the area of subject matter encompassed by a class should be analysed for claimed disclosures of AB and Ap combinations. The various combinations of this nature which are similar and of which there are a sufficient number to form a subclass are grouped together and a specific subclass is created therefor. For example; many classes include a subclass titled "With signal or indicator" which is a combination consisting of the basic subject matter of the class combined with a means to indicate a condition of the basic subject matter. Having separated out and established appropriate subclasses for other such combinations there usually remains a miscellaneous group of AB and Ap combina-

tions, each of which is dissimilar from the others, and none of which appear in sufficient numbers to justify a specific subclass therefor. To provide for this latter group, a subclass titled "Combined" is established. This subclass, in effect, is a miscellaneous subclass for all claimed disclosures directed to AB and Ap combinations and not provided for by establishing a specific subclass therefor.

The subclass titled "Combined," being a miscellaneous subclass for all AB and Ap combinations not specifically provided for, should be placed in a schedule following all subclasses providing for some specific AB and Ap combinations. A further benefit to be derived from the presence of a first line miscellaneous combined subclass is that the subclass serves as a division marker between that portion of the schedule that provides for AB and Ap combinations and the portion that provides for basic subject matter and subcombinations thereof. This latter benefit accrues because of the exhaustive nature of coordinate subclasses as set forth in section 406. It is obvious that with such a subclass, no search for an AB or Ap combination, as defined in that subclass, need be made below the position of the miscellaneous combined subclass in a class schedule.

It is difficult to define the miscellaneous combined subclass so that a common definition could be used in every class. The scope of the miscellaneous combined subclass varies from class to class. In the class of Dispensing, this subclass is defined as follows:

192 Dispensers under the class definition claimed in combination with features other than the container structure and discharge assistant means and not provided for in preceding subclasses.

- (1) *Note.* Container structure includes handles and/or handgrips, the inlets and/or outlets and their check-valves, manually actuated valves, discharge controllers and/or closures and actuating devices for such parts.

- (2) *Note.* Discharge assistants include all mechanism that moves or tends to move material toward or through a discharge outlet, fluid currents for the same purpose and actuating means therefor.
- (3) *Note.* In this subclass, for example, are combinations with a firearm, bicycle, mirror, tools, or implements (cutters and punches are in subclass 80+ and dispensers combined with tool or implement handles are in subclass 191), supports for additional articles, bumpers to absorb shock, protector rings, display or exhibiting means which do not display the material (subclass 154+), display or exhibit a condition, or perform a measuring function (subclass 23+), specific material to be dispensed, hand shields and sediment traps, or other material separating means (other than those in subclasses 188 and 189).
- (4) *Note.* All preceding subclasses must be investigated for particular combinations within this definition and shown by the preceding subclass titles.
- (5) *Note.* See the notes to the main class definition for combinations of dispensers with other devices located in other classes.

As pointed out in this definition, not all combinations which may be considered AB and Ap combinations are in this subclass or above it in the schedule; those which relate to dispensers combined either with container structure or a discharge assistant may be found later in the schedule. Apparently these features are so common to dispensers as to make it impractical to consider them as perfecting or combined features and by excluding them as such by definition from the combined subclass, they are treated as basic subject matter of the class.

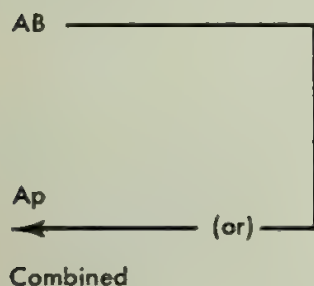
The class of Solid Material Comminution or Disintegration has a note in its combined subclass as follows:

- (1) *Note.* The combined features are in addition to the necessary drive and static mount-

ing means for the comminutor (e.g., subclass 285+), the feed and/or discharge mechanism therefor and/or means for controlling the flow of material to, through, or from the comminuting zone (e.g., subclasses 109, 135+, 171, 186, 202, 222+, 245+, 265 and 271), additional comminuting devices (e.g., subclasses 104, 105, 108, 115+, 134+ and 152+), means for retaining material within the comminuting zone or for returning escaped material thereto (e.g., subclasses 119, 124 and 226), means for cleaning the comminuting surfaces (e.g., subclasses 112 and 166+), means to balance the comminuting elements (e.g., subclass 292), and means to lubricate the comminutor.

This note clearly sets forth subject matter too common to the basic subject matter to be classified separately from it and thus excluded from the concept of combined.

Thus for each class the Classifier must determine the scope intended for the miscellaneous combined subclass and must carefully define the subclass. The searcher must be particularly careful to review the definitions and note of the miscellaneous combined subclass to be sure that he understands the scope of the subclass and the extent to which his search may or may not be extended beyond the subclass for the subject matter he is seeking to find. The following diagram demonstrates the relative positions of the subclasses AB, Ap and "Combined" in a class schedule:



*Note.* In this and the following diagrams of this type the more common arrangement is shown by the letters, with alternate arrangements shown by the arrows.

#### 412 *Subclass That May Be Either AB or Ap*

A subclass may be created which is based on a feature broad enough to constitute either

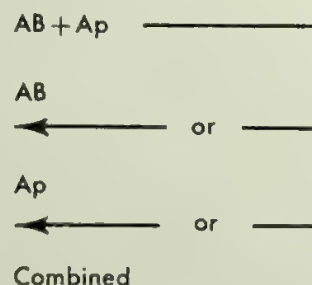
an AB or Ap combination depending on its relationship with the basic subject matter. This may be illustrated by the following example:

In a class of Tools the following subclasses may appear:

- 4 With material holder or disposal
- 5 Handle receptacle
- 6 Ejectors or strippers

Subclass 4 is based on the combination of means (1) to hold material (including but not limited to material worked upon) or (2) to dispose of material combined with a tool which means may form the basis for an AB or Ap combination depending on its relationship to the basic subject matter as shown by the indented subclasses. Subclass 5 has a receptacle in the handle of the tool—for example, a handle in the form of a chalk holder, clearly a combined feature B. Subclass 6 has means to eject or strip material from the tool (a character of cleaning) and is for a perfecting feature p. Thus some subject matter involves a combined feature B for an additional purpose and some a combined feature p to perfect the tool.

Thus, at times, in the portion of the schedule above combined there should be subclasses based on a feature which may constitute either an AB or Ap combination using the indicated alternative arrangements for placement in the schedule:



As shown, these may be arranged in any order but the order selected should be the one giving maximum accuracy and shortness of search with a minimum of cross-referencing.

When such a subclass is created, further subdivision thereof if warranted should be on the basis of the relation which will tend to separate the AB and Ap combinations, as shown by subclasses 5 and 6 in the above example.

#### 413 *Other Subclasses Usually Placed Above Combined*

There are several types of subclasses other than those directed to AB and Ap combinations which are generally placed ahead of the miscellaneous combined subclass in a class schedule. These subclasses vary in type from class to class depending on the dictates of the subject matter to be classified. It is possible that a class may include none of these types whereas another class, depending on the search requirements as determined by the Classifier, might include all of them in its schedule. Therefore no general principle can be stated as to which of these subclasses should be established in a particular class. For the purpose of this discussion, and in the absence of a more appropriate term, these subclasses will be referred to as "special" subclasses in the sense that they provide for subject matter which must receive special treatment by being placed above the miscellaneous combined subclass in a class schedule. The subject matter of these subclasses must be selected with discretion and the selection can only be done in a particular class by means of a thorough analysis of all the documents involved.

These subclasses are chosen for a variety of reasons, which may be best summarized by one principle, namely, each one represents a collection of subject matter which searchers will at times want to see alone and as separate groups and which might be lost as a search field unless provided for high in a class schedule above the miscellaneous combined subclass.

#### 414 *Title "Special" Not Proper*

The concept "special" as such cannot successfully be defined. Special connotes specific and that which is special can only be adequately defined in particular or specific instances. Attempts have been made in the past to provide subclasses titled "Special"; however, the concept inevitably proves vague and confusing in definition.

For example:

In the class of Brushing, Scrubbing and General Cleaning the subclass titled "Special work" is defined—

"Implements of the brush or broom type especially fitted by shape, bristle arrangement, or otherwise for use on particular classes of articles or work, other than those indicated by subtitles 161-167, and 211, of this class."

In the class of Tools the subclass titled "Special" is defined—

"Tools having a construction which limits them to work upon a specific article and for which there is no art classification."

In the class of Sewing the subclass titled "Special machines" is defined—

"Adapted for special work."

A study of the definitions of these subclasses gives a clear indication of the meaningless nature of an attempted general definition. Experience has shown that the concept "special", per se, should not be used as the basis for a subclass but rather the particular type of special subject matter involved should be specifically titled and defined.

#### 415 *Categories of Special Subclasses*

In general the so-called "special" subclasses are of the following four general types:

1. Subclasses in which the subject is based on an ultimate or remote function in a class

generally divided on a proximate function basis.

2. Subclasses to a combination in which the same element of the combination may either constitute an AB or Ap combination or form part of the basic subject matter depending on its function.

3. Subclasses directed to a specific type of basic subject matter in which the AB and Ap combinations involving such basic subject matter are different from those involving other types of basic subject matter.

4. Subclasses in which unique subject matter is considered of great importance insofar as a search field is concerned.

The above listed types of subclasses and their position in the schedule will now be discussed in detail.

#### 416 *Subclasses Based on Ultimate or Remote Function*

The Classifier may occasionally find it expedient to collect a body of subject matter based on a remote or ultimate function. Because these subclasses usually involve various combinations and also because of the unique nature of the search they should be positioned in a schedule ahead of Combined. In the class of Solid Material Comminution and Disintegration a subclass titled "Bottle breaker," precedes Combined. These are machines specially designed to break bottles involving peculiarities for which no better basis of collection could be determined than their ultimate or remote function of breaking bottles. In the class of Earth Working, a subclass titled "Lawn edger" and a subclass titled "Sod cutters" provide for subject matter representing a necessary field of search and are collected on the basis of the remote function of edging lawns and cutting sod.

In the class of Presses a subclass titled "Portable receptacle lid applying," provides a col-

lection of subject matter which has a unique flavor but can be characterized only on the basis of the remote or ulterior function of applying a lid to a container.

#### 417 *Subclasses Directed to a Feature Which May Be of a Different Class or Basic Subject Matter*

In the class of Solid Material Comminution and Disintegration a subclass provides for apparatus including means applying fluid to material being comminuted. In some instances the fluids perform a function not of the class: for example, to separate the finely ground material from coarsely ground material thereby forming an AB combination. In some instances the fluid performs a perfecting function for example, cooling so that the comminuting function can be carried out at a higher speed thereby forming an Ap combination. In other instances the fluid forms a part of the basic subject matter A: for example, where the kinetic energy of a suspending fluid is necessary to cause the comminuting function.

This subclass was placed preceding Combined in the schedule so that similar structures may be collected therein regardless of whether the features provided for constituted AB or Ap combinations or was part of the basic subject matter.

#### 418 *Basic Subject Matter Having Unique AB or Ap Combination*

Occasionally in creating a class the Classifier will determine that a particular group of patents relate to a peculiar character of basic subject matter. The nature of this subject matter is such that the various AB or Ap combinations involving this basic subject matter are distinct and different from such combinations involving other basic subject matter of

the class. In these circumstances the unique basic subject matter may be separately provided for in a subclass positioned in a superior position in the class schedule so as to collect all AB or Ap patents as well as patents to such basic subject matter alone. As an example of this, the class of Presses provides for binding devices and processes in subclasses as follows:

- 1 BINDING
- 2 Methods
- 3 Compacting and binding
- 4 With automatic or material triggered control
- 5 With material winding or folding
- 6 With material severing
- 7 With material depositing or discharging
- 8 Binder applying
- 29 Binder tighteners and joiners
- 30 Sleeve or clamp joining
- 31 Twisters
- 32 Binder tighteners
- 33 Joiners
- 34 Binder retaining material holders
- 43 AUTOMATIC CONTROL
- 70 WITH ADDITIONAL TREATMENT OF MATERIAL
- 76 Winding or folding, web, sheet or strand
- 94 Cutting, breaking, piercing or comminuting

Binding is a highly unique type of basic subject matter relative to other basic subject matter in the class of Presses, and the various AB or Ap combinations involving such basic subject matter are different from all other AB or Ap combinations in the class. Note that subclass 4, with automatic or material triggered control, finds its counterpart in subclass 43. Subclass 5, with material winding and folding, is duplicated in subclass 76. Subclass 6, with material severing is duplicated in subclass 94, etc. What appear to be redundant fields of search, however, are distinct mutually exclusive searches because of the unique nature of these combinations when the basic subject matter portions thereof relate to binding.

#### 419 *Subclasses Directed to Relatively Important Subject Matter*

The general principles of schedule organization require that special purpose subject matter be given precedence over general purpose subject matter and that relatively important precede less important subject matter. The Classifier may determine that certain subject matter is important enough to give it priority by placing subclasses therefor quite high in the class schedule. For example, the class of Plastic Article Shaping has a subclass providing for the formation of solid particulate material directly from a molten or liquid mass by liquid comminuting. This is basic subject matter for the class but was considered to be of such special and unique character by the Classifier as to warrant positioning this subclass high in the class schedule. This was also true of a subclass directed to recycling of reclaimed or purified process material, and a subclass directed to applying explosive force to make an article. In each of the above examples the basic subject matter was considered to be of sufficient importance in the judgment of the Classifier to warrant special treatment. This category of special subclasses is not limited to unique basic subject matter but also includes subject matter relating to unique concepts such as, for example, condition responsive control, measuring and testing, convertible, etc., which are found in almost all classes and which are generally placed above the miscellaneous combined subclass.

#### 420 *Condition Responsive Control*

Condition responsive control for an apparatus (e.g. machine or system) constitutes an important and active patent area. Therefore every class which includes such subject matter should provide subclasses based on such

concept to provide an adequate search therefor.

In general, condition responsive control includes both (1) means to sense a condition or change of condition, which condition may or may not occur or change, which means (2) effects a control function on an apparatus.

These specific examples will serve to illustrate the type of subject matter which comes within this concept. (1) A pump, a motor for driving the pump and a pressure responsive element positioned downstream of the pump to sense the pressure of fluid pumped, which sensing means actuates a switch which is effective to stop the pump motor. (2) A heating system for a dwelling having combined therewith a thermostat located outside of the dwelling to sense the outside temperature, and switch means which responds to temperature changes sensed by said thermostat to effect the operation of the heating system. (3) A metal bending machine adapted to bend metal stock fed to such machine provided with means to sense the absence of, or some physical characteristic of such stock material and means responsive to such sensing means to alter the operation of the machine in some way if there is no stock material in the machine or if the physical characteristic being sensed is not within certain prescribed limits. (4) A spring loaded check valve or frangible element in a pipeline or other fluid containing system which is adapted to open or rupture respectively upon a rise in pressure in the pipeline or system to relieve the pressure therein.

#### 421 *Control Must Be for Some Operating Portion of the Apparatus Other Than a Signal or Indicator*

Where the control means responsive to the sensing means merely operates a signal or indicator or adjusts a scale which signal, indicator

or scale conveys information as to the magnitude or existence of the condition sensed, the combination and interrelationships do not fall within the concept of condition responsive control. (Of course in classes where the basic subject matter involves the thing controlled, such as the class of Measuring and Testing or the class of Signals and Indicators, these combinations may fall within the concept of condition control.) See section 430 for a further discussion of this subject matter.

#### 422 *Cyclic Operation Not Condition Responsive Control*

The concept of condition responsive control must be differentiated from mere cyclic operation. A machine performing repetitive operations has a law of operation more commonly known as the "law of the machine" in which various controls are responsive to a cyclic rather than a noncyclic condition and do not come within the scope of this concept. An illustration of cyclic operation is a die stamping machine having means to feed a blank to the dies in proper sequence, means to eject the stamped article from the dies and means to convey the stamped article to a delivering station. Such machine has a cyclic law of operation since the machine, once started, will repeat the same sequence of manipulative steps until it is stopped. This sequence is governed by various mechanisms which sense the position of the machine parts to govern the direction or period of movements of such parts in a repetitive sequence. This is not condition responsive control since the condition or change of condition which is sensed is not a condition or change of condition which may or may not occur or change but is a condition which occurs in a regular manner each time a predetermined or programed sequence of manipulative steps is repeated.

#### 423 *Changes in Operation Effected by Attendant Not Condition Responsive Control*

Many machines have controls to change some aspect of operation so as to adjust the machine to meet changing conditions. Where a machine attendant observes the changed condition, and makes the necessary adjustments, the concept of condition responsive control is missing. Such changes may involve changing the cycle of operation of, or starting or stopping the machine. In a machine operation, starting and stopping means which invariably requires intervention of an attendant (who performs the starting or stopping in accordance with conditions he observes) is not embraced within the concept of condition responsive control. Thus in order for the concept of condition responsive control to be complete the means which senses a condition or change of condition must also effect a control function on the apparatus when the condition or change thereof occurs.

#### 424 *Automatic Control*

As stated in section 420 condition responsive control generally includes (1) a sensing means which (2) effects a control function for a machine or system. This may include two situations. In the first situation the sensing means and the control means are the same unitary element. For example, a spring biased check valve in a fluid system which senses a high pressure and opens to relieve such high pressure, thereby controlling the pressure in the system. In the second situation the sensing means does not directly effect the control, but influences a second element which element effects the control. For example a fluid system having an electric motor operated relief valve therein, and a pressure sensing device compris-

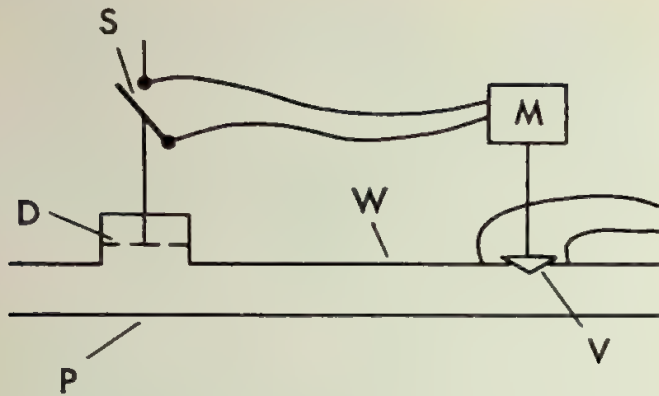
ing a piston and cylinder device in communication with the system, wherein an abnormal pressure acts on the piston in the cylinder to move the same, to actuate a switch for starting the electric motor which in turn opens the valve to control the pressure in the system. The condition responsive control set forth in this latter situation is called "Automatic Control."

Automatic control contains all the essential elements of condition responsive control but is a restricted species thereof in which the sensing means and the control means must be separate and distinct elements. Generally automatic control includes (1) means to sense a condition or change of condition which condition or change of condition may or may not occur which means is effective to activate a separate means (2), which separate means is effective to control an apparatus (3).

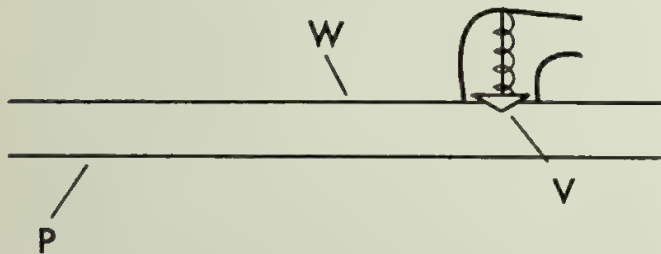
The concept of automatic control then may be summed up as control means responsive to means sensing a noncyclic condition, and a subclass entitled "Automatic Control" should contain no patents to subject matter which does not include all of the three essential elements in the preceding paragraph.

#### 425 *Separate Sensing and Control Means*

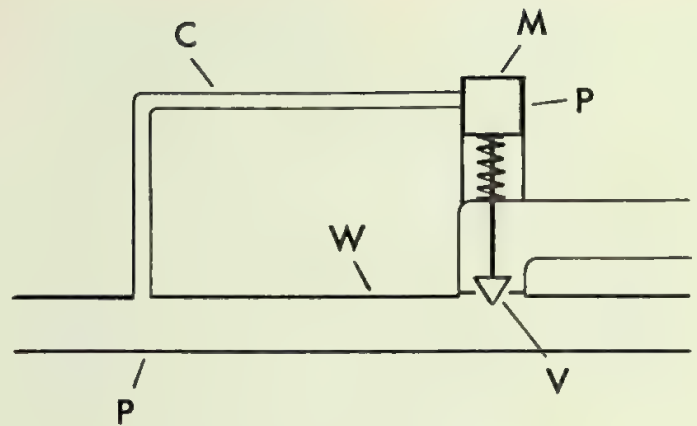
Just what constitutes a sensing means that is separate and distinct from a control means often may be a perplexing problem unless clearly delineated by the definitions. The following figure illustrates a type of distinctness easily distinguishable, in which a sensing membrane *d* in flow line *p* is operatively associated with a motor by means of a switch *s*. The motor controls valve *v* mounted in wall *w* of flow line *p*. The parts are so arranged that the sensing means, in response to a change in pressure in the flow line, operates the switch that actuates the valve.



The figure below illustrates a typical apparatus in this area that is within the concept of condition responsive but generally would be excluded from the general definition of automatic control, since a single element *v* performs the dual functions of sensing and controlling.



It is sometimes difficult to determine what are in fact separate sensing means and control means, as demonstrated by a third type of apparatus, which is illustrated below. This figure shows a pipeline *p*, having a valve *v* in the wall *w*, the valve being rigidly connected to a piston *P* in a cylinder *M* which is connected to pipe *p* by line *c*. With this third type it may be argued that the sensing means and control means—the piston and valve respectively—are in fact separate elements because the sensing surface and controlling surface are separate and distinct even though they are part of the same element. On the other hand, it may be argued that the sensing and control means are not separate elements, since they are part of a single integral member.



#### 426 *Every Class Should Provide for Automatic Control if Possible*

Some classes contain sufficient disclosures directed to automatic control to justify creating more than one subclass to provide a proper field of search for this concept. The subclasses created in this situation must take into account the subject matter being classified. In some classes it may be desirable to provide for certain specific types of automatic control by specifically entitled subclasses. In practically every class however, there should be a subclass for miscellaneous automatic control subject matter unless there are compelling reasons why such a subclass should not be established.

#### 427 *Subdividing Automatic Control Subject Matter*

The subclasses created to provide for specific types of automatic control may be placed either above the miscellaneous automatic control subclass or indented thereunder. When these subclasses are indented under the miscellaneous automatic control subclass, experience has shown that better search fields are established if the indented subclasses are based on the controlled portion of the apparatus rather than on the sensed condition or the

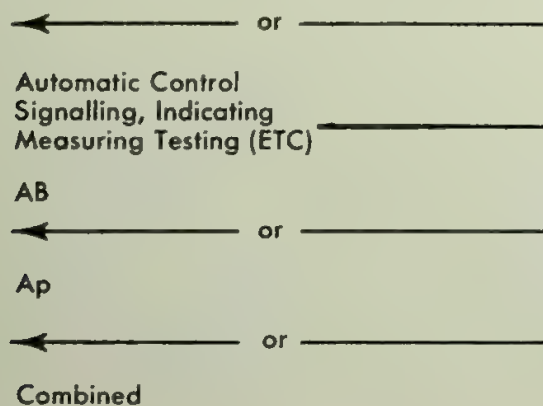


The subclass entitled "With stopping or starting" was placed ahead of the subclass for automatic control since the Classifier who evaluated the subject matter concluded it was best to place disclosures relating to manual starting or stopping and for automatic control starting and stopping apparatus in the same subclass.

#### 430 *Subclasses Relating to Measuring, Testing, Signalling, Indicating, Etc.*

In many classes there is a body of subject matter in which there are means to sense a condition which sensing means causes operation of an indicator, adjusts a scale, or otherwise conveys information as to the magnitude or existence of the condition sensed. When combined with the basic subject matter of a particular class, these devices are usually provided for in specific subclasses in that class.

These concepts are closely related to the automatic control concept discussed in the preceding sections in that both concepts involve means to sense a condition. Frequently many patents directed to automatic control will in addition cause actuation of a signal or indicator. For example, the relative numbers of the kinds of claimed combination may determine whether a subclass for measuring or testing subject matter should precede or follow an automatic control subclass [see section 445]. A subclass for this subject matter should be positioned as follows:



#### 431 *Convertible*

Many bodies of subject matter large enough to form the basis of a separate class contain patents to devices which by some adjustment, manipulation, rearrangement, addition or omission of some parts thereof may be changed to some other device. This character of subject matter is peculiar and important enough to be given special consideration in a class schedule by creating subclasses therefor.

These devices are generally of two types.

(1) A device comprises the basic subject matter of one class and is changed to a device which comprises the basic subject matter of another class. For example, a chair may have its back portion so related to the seat and arm portions as to be pivotally movable from back rest position to horizontal position overlying the arms, thus changing the chair (basic subject matter of one class) to a table (basic subject matter of a second class). (2) A device comprises the basic subject matter of one class and is changed to a device which comprises a different type of basic subject matter of the same class. For example, the class of Motor Vehicles provides separately for a motor vehicle that is driven on an endless track structure and for one that is driven on wheels. Thus the disclosure of a motor vehicle provided with both wheels and endless tracks, which by some manipulation of the parts of the device would selectively make either the wheels or endless tracks available upon which to drive the vehicle, would change the wheeled motor vehicle to an endless track motor vehicle or vice versa, both being basic subject matter of the same class.

#### 432 *Three Possible Types of Subclasses for Convertible Subject Matter*

In most instances a subclass directed to such subject matter includes both types (1) and (2). However there may be situations in

which it may be desirable or necessary to limit the subclass to either of types (1) or (2).

Where the subclass for such subject matter includes both types (1) and (2), it should be titled "Convertible" and should generally be defined as follows:

"Apparatus under the class definition which by relative rearrangement of its parts or by the addition or omission of a part is so changed as to become (A) basic subject matter of the same class of a different character or having a different mode of operation or (B) basic subject matter of another class."

A subclass limited to subject matter directed to changing the basic subject matter of the class into the basic subject matter of a different class should be entitled "Convertible To Apparatus of A Different Class." The definition of such subclass should be the definition set forth above with portion (A) thereof omitted.

A subclass limited to subject matter directed to changing the basic subject matter of the class to basic subject matter of the same class having a different character or having a different mode of operation should be entitled "Convertible to a different apparatus of this class." The definition of such subclass should be the definition set forth above with portion (B) thereof omitted.

#### 433 *Difference Between Convertible and Adjustable*

Type (1) does not as a general rule present many problems. A device of one class which by some manipulation of parts becomes a device of another class is considered convertible regardless of how insignificant the rearrangement, omission or addition of the parts may be. However in type (2) above careful analysis is sometimes necessary to differentiate between that which is considered convertible and that which is merely adjustable.

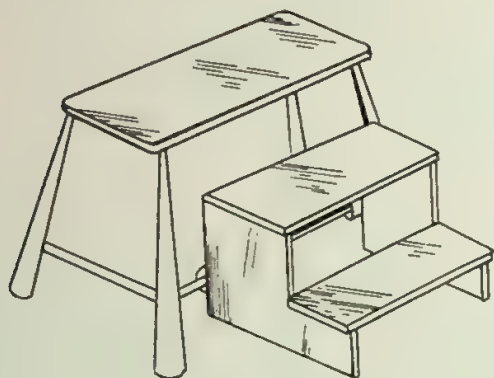
Adjustability of parts is common in most mechanical subject matter and generally refers to a modification of means which results in a change in degree only of some characteristic of the apparatus rather than a change in kind. For example the separation of the rolls of a clothes wringer may be adjusted to accommodate various thicknesses of work (a) by means of a variable spacer or (b) the clothes wringer may also be changed by substituting rolls of different sizes. In both cases the change or adjustment does not alter the character of or the mode of operation of the wringer press couple. In both instances the device is a roll press, before and after the modification rather than being converted to a different type of wringer. If however, a fixed flat platen were substituted for one of the rolls, the press would then become a different character of device with a different mode of operation.

Whenever a conflict exists between subject matter for the convertible subclass and subject matter considered as being merely directed to adjustability and classified elsewhere in the schedule, the definition of the convertible subclass should contain all necessary notes excluding such subject matter therefrom and indicating where such subject matter is classified.

#### 434 *Position of Convertible in a Schedule*

A convertible subclass which includes the type in which an apparatus is changeable from an apparatus of one class to an apparatus of another class may be theorized as in fact including the subject matter of such other class. Further, in some instances it may be difficult to determine whether or not an apparatus is convertible to an apparatus of a different class or combined therewith. A simple example of this comprises a stool having associated therewith some steps so related to the stool that the steps can be swung about pivots into the stool,

which then performs a normal chair function, or moved out of the stool so as to form a stepladder as follows:



Such an organization could well be treated either as a chair convertible to a stepladder or a combined chair and stepladder, since the stool portion continues to be available and usable as a chair in either positions of the apparatus.

For these reasons a convertible subclass in which an apparatus is changeable from an apparatus of one class to an apparatus of a different class should be either positioned in a class schedule ahead of the subclass titled "Combined" or grouped with it in a subclass having the title "Combined or convertible," as follows:

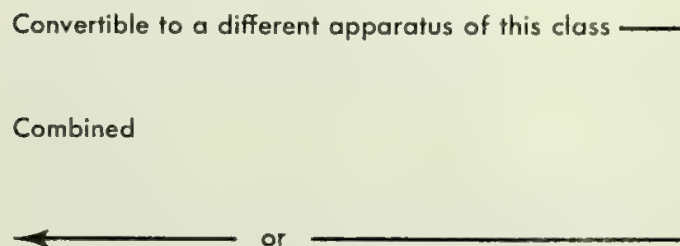
Convertible  
Combined  
(or alternatively)  
Combined or Convertible

The above positional arrangement should be followed even if some of the devices of the patents before and after conversion are of the same class.

The main criterion which determines whether the combined and convertible subject matter should be placed together in the same subclass is the number of patents involved. If a sufficient number of patents is found to justify separate subclasses for these two concepts, then separate subclasses therefor should

be created. However if relatively few patents are found the two concepts may be combined in the same subclass. If these two concepts are included in the same subclass, such subclass should include a two-part definition, one directed to the combined portion and the other directed to the convertible portion.

Where the convertible subject matter is limited to the type in which the change is to a different type of basic subject matter of the same class, it may be positioned either above the subclass titled "Combined" or below it in accordance with the general principles of superiority, but never grouped with it in a single subclass. The arrangement being:



#### 435 *Subclasses for Plural Basic Subject Matter*

Subclasses generally should be provided for combinations between two or more of either the same or different types of basic subject matter (plural A). They should precede Combined when the combination of  $A_1$  and  $A_2$  and the combinations AB should be associated together. By way of example, in the class of Dispensing (see Appendix I), subclass 129+ precedes subclass 192 Combined, since the combination of a dispensing and non-dispensing container (AB) and the combination of two dispensing containers ( $A_1 + A_2$ ) were considered best associated together.

When the above situation does not pertain, then these plural A subclasses should follow the combined subclass, usually immediately thereafter but under some circumstances following certain types of basic subject matter A.

For example the class of Solid Material Comminution and Disintegration provides the following subclasses:

- 101 Combined or convertible
- 107+ Plural rotary or oscillatory surfaces co-operate with common surface, e.g., chasing mills
- 134+ Parallel material flow through plural comminuting zones
- 152+ Series material flow only through plural comminuting zones

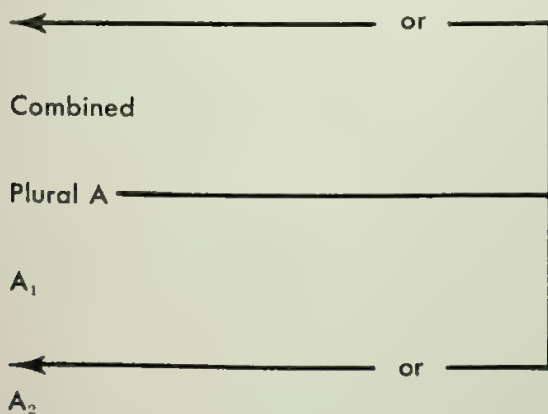
The plural A subclasses, 134+ and 152+, were placed following subclasses 107+ since it was impossible to decide whether a chasing mill was a single mill or a combination between plural mills of the same type. By placing subclasses 134+ and 152+ following subclasses 107+ uncertainty on the point was avoided.

In the class of Presses, it was found expedient to set forth plural A subclasses as follows:

- 102 Combined
- 137+ Plural diverse presses
- 144+ Concurrent pressing and conveying
- 193+ Plural presses

It was found expedient to divide the plural presses into two groups, plural diverse presses (137+), and plural presses (193+). This was done because of the conflict between subclasses 144+ and the plural diverse presses. This conflict was resolved by placing that latter group ahead of 144+ in the schedule.

Thus, relative to plural A subclasses the schedule arrangement has the alternatives.



#### 436 *Subclasses Following the Miscellaneous Combined Subclass*

The subclasses that follow the combined subclass in a schedule are those containing the basic subject matter A for the subject matter undergoing classification and subcombination X of the basic subject matter. As pointed out above in section 411, certain combinations may follow the miscellaneous combined subclass when excluded by definition from that subclass. Attention is directed to that section for a full discussion of the relationship of the miscellaneous combined subclass to the basic subject matter portion of the class.

Within this portion of the schedule, the subclasses must be carefully arranged, attention being paid to the relationships of the subclasses so as to best set forth and maintain the proper search fields. General principles relating to the schedule as a whole should be followed, that is, the larger combinations should precede lesser combinations, specialized subject matter should precede general subject matter, and the subclass arrangement should proceed from the complex to the simple. Thus, in general all distinct types of basic subject A should precede subcombinations X in the schedule, so that the schedule terminates with subcombination subclasses.

#### 437 *Subcombinations Specialized to a Single Type of Basic Subject Matter*

In an indented subcombination whose sole use is a combination which constitutes a particular type of basic subject matter of a class may be provided for the same first line combination subclass group providing for such subject matter, rather than being provided for in a subclass coordinate with and succeeding the first line combination subclass of such group. When this is done, which is infrequently, the first line combination subclass providing for

such basic subject matter must be defined broadly enough to include the indented subcombination within its scope. The subcombination should be titled and defined to be restricted to the subcombination per se.

If the first line combination subclass definition is limited to a combination thereby excluding the subcombination, it would be contrary to classification principles to indent a subclass directed to a subcombination thereunder. The subcombination subclass would not, under these circumstances, include all the limitations of the subclass under which it is indented as required by section 514.

#### 438 *Subcombinations Specialized to a Class*

Subcombinations specialized to the class but not specialized to a single type of basic subject matter should be collected together following all of the types of basic subject. For example, the class of Solid Material Comminution and Disintegration has the following subclasses:

Apparatus  
291      Comminuting elements

This subclass (291) is in an inferior position in the class schedule and is the miscellaneous subclass for all comminuting elements not specifically provided for above in the schedule. These comminuting elements are specialized to comminuting and disintegrating devices.

#### 439 *Subcombinations of General Utility*

Subclasses for subcombinations or elements of general utility with basic subject matter combinations of a particular class or with the subject matter of other classes are placed at the end of the class unless there is an existing class which provides for such subject matter. In the class of Coating Apparatus, the last group of subclasses relate to work surface,

shields, masks or protectors. This subject matter has utility not only with coating devices but with various other work treating devices where it is necessary to protect a portion of the work surface. This subject matter is therefore positioned last in the schedule, after other subcombinations specialized to use with the basic subject matter of the class.

#### 440 *Position of Subclasses Following the Miscellaneous Combined Subclass*

The part of a schedule that provides for the basic subject matter of the class should, in general, be arranged as follows:

Combined  
A<sub>1</sub>  
A<sub>2</sub>  
    X<sub>2</sub> subcomb'n specialized to A<sub>2</sub> (see section 437)  
A<sub>3</sub>  
X specialized to class  
X general utility

#### 441 *The Miscellaneous Subclass*

Every class should have a first line subclass titled "Miscellaneous" in which is collected all subject matter assignable to the class for which no specific subclass is provided. The presence of such a subclass makes a class truly exhaustive of subject matter of the class. Subject matter which results from future developments not anticipated at the time the class is created can be collected in such a miscellaneous subclass until sufficient patents to such subject matter are obtained to create specific subclasses therefor. In the absence of such a subclass, variants of the basic subject matter of the class and subcombinations thereof not specifically provided for would of necessity be excluded from the class.

This miscellaneous subclass is placed as the final subclass in the class, the most inferior po-

sition. This position is selected because the subclass is residual for all unprovided for subject matter of the class. The definition of the subclass is broad and general because of this residual character. Thus, following the principle of classification set forth in section 404 which states that the subclass order should precede from the specific to the broad, the particular to the general, the miscellaneous subclass is placed as the last subclass of the schedule. A further benefit deriving from this placement is that it requires a searcher to proceed down the entire list of first line subclasses and determine that his search does not involve the characteristic identified by any first line subclass before considering the subclass representing the class miscellaneous.

As pointed out in section 407, first-line subclasses provide for the miscellaneous subject matter within the definition of the first-line subclass and not specifically provided for in any subclasses indented thereunder. Since every first-line subclass is in fact a miscellaneous subclass for the characteristics identified by its title and definition, in a well planned class there will be little remaining to be placed in the subclass titled "Miscellaneous." An inspection of any modern class will indicate how little subject matter remains for this miscellaneous subclass because the first-line subclasses provide for all but a few random concepts of the class represented by only a very small number of patents. It may even be necessary for the Classifier in creating a schedule to cancel a first-line subclass having few patents in order to provide subject matter for the miscellaneous subclass. Thus a miscellaneous subclass will, in general, contain only such types of basic subject matter A and such subcombinations thereof as are not set out in the A and X subclasses of the schedule. It will have no combinations of the AB or Ap types due to the miscellaneous combined subclass, nor will it have any plural A or convertible

subject matter if subclasses are created to provide for these concepts.

In the past it was occasionally the practice to have a miscellaneous subclass at the end of each major section of a class having plural sections, each section being headed by an unnumbered and undefined first-line subclass title, as follows:

	In the class of Electricity, Voltage Magnitude and Phase Control Systems
	Voltage magnitude control
100	Miscellaneous
	Phase control
129	Miscellaneous

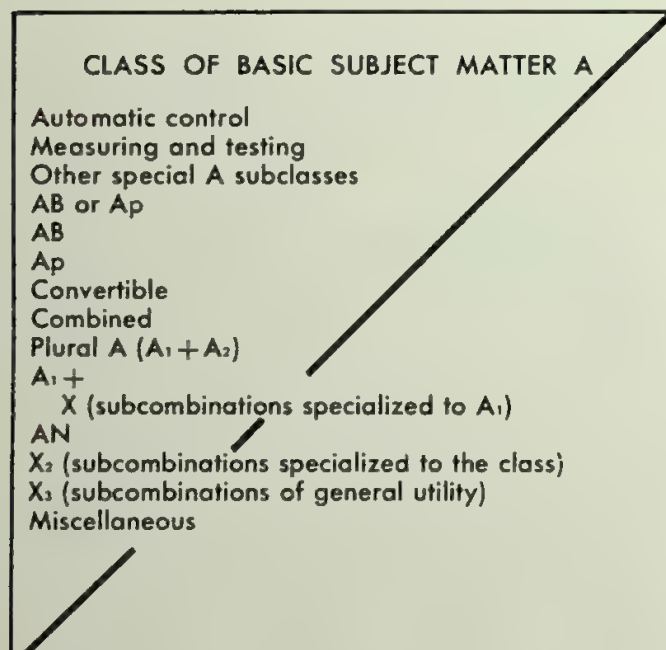
However the use of unnumbered titles is no longer considered proper. Their use makes definition of indented subclasses repetitive and difficult. As pointed out above the first-line subclass is the miscellaneous subclass for that feature, therefore it is more logical to number the first line subclass.

#### 442 *General Chart of a Classification Schedule and Diagramming a Schedule*

The following chart is a summation of sections 403 to 441 relating to arrangement of subclasses in a class schedule. It lists the subclasses in the order that has generally been found to solve the major problems of subclass organization in creating a class schedule. As pointed out in each of these sections, however, many circumstances can alter the general pattern shown below, and the Classifier has great discretion insofar as placement of specific subclasses is concerned. Each project is a separate problem to be solved in the light of the facts of the particular subject matter being classified. Experience has shown that (1) good classification requires that the subject matter of the documents must control schedule creation and that (2) it is not expedient to establish a schedule for a new class without

complete analysis of either all the documents in the area under consideration or of a representative sample thereof. Thus the particular position and scope for any subclass must be separately determined in each case, within the allowable tolerances that the principles of subclass superiority permit. Those tolerances have been detailed above and reference should be made to the detailed discussion of each type of subclass for possible variations in position relative to the other subclasses.

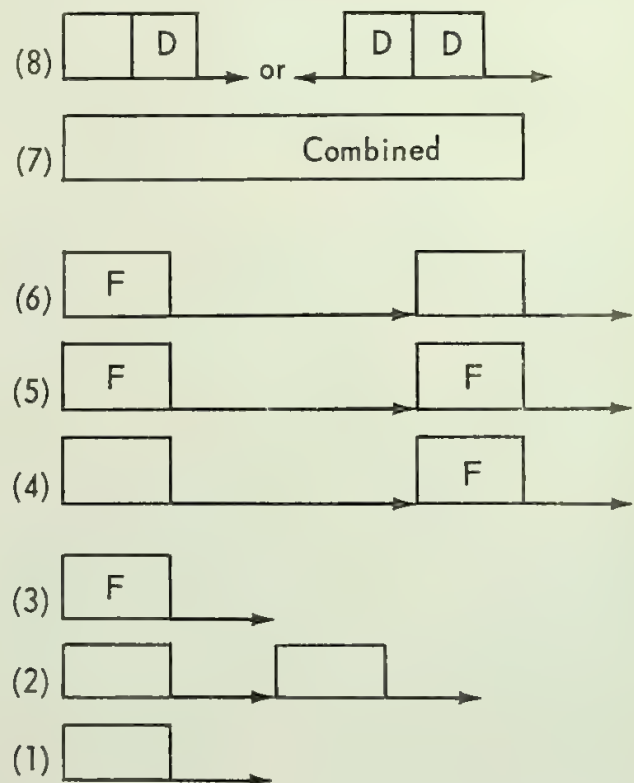
The inverted right triangle superposed on the schedule below represents a modern class or major segment of a class. As shown, the subclasses for the most elemental subject matter are located in the lowest portion of the triangle. The broadening of the triangle from the bottom to the top represent the increase in complexity or importance of subject matter from the lowest or most inferior subclass to the highest or most superior subclass.



A general consideration of the class of Dispensing (see Appendix I), will serve as an illustration of many of the points made in the preceding sections and of the possible use of diagramming as an aid in the understanding of the arrangement of subclasses. In addition,

the following illustrates by a specific example the general plan of a class as shown by the preceding chart.

A dispenser comprises a source of supply and means for causing or controlling discharge therefrom. Probably the simplest form of dispenser is a supply container, i.e., a receptacle, having an outlet shaped to guide the material being poured out. A pitcher is a dispenser, a cup is not. The simplest form may be represented by an enclosed area having an arrow extending therefrom. See (1) in the following figure and subclass 566+.



The dispensed material leaving the supply container by gravity may enter a second receptacle or a compartment of the first, from which it flows by gravity or is removed manually. This second compartment is generally known as a trap chamber and may be a measuring chamber or an access arrangement, for example, barometric. It is represented at (2) in the figure by a second box or enclosure and by subclass 424.5+.

At (3) is represented the type of dispenser having a supply chamber with means acting

in addition to gravity to cause the dispensing operation. There is no trap chamber, and the forcing means, indicated by F, is usually fluid pressure or a follower or an unenclosed conveyor element acting directly on the main body of the material. Subclasses 386 through 415 provide for this subject matter.

Next and in ascending order of complexity, clearly brought out in the figure, we have at (4) a supply container furnishing material by gravity to a trap chamber in which the material is moved or from which it is forced, typically a movable or conveyor type trap chamber, provided for in subclass 344+, or a container with a pump provided for in subclass 344+, or a container with a pump provided for in subclass 372+.

(5) represents plural forcing operations, force being applied both in the supply and in the trap, provided for in subclass 252+.

As diagrammed, (6) may appear less complex than (5), since it provides for force only in the supply container with gravity or manual removal from the trap. Subclass 205, providing for such subject matter, was placed above subclass 252+ so that the subclasses under (5), (4), and (3) could be indented under subclass 251, which thus constitutes a miscellaneous subclass for all dispensers which have assisted discharge means as the final (or only) means.

(7) represents subclass 192, the miscellaneous Combined subclass.

(8) represents the two distinct types of dispensers of subclass 129+ one involving the basic subject matter of the class with a combined feature, namely, a second compartment which is not a dispenser (shown at the left) and the other the basic subject matter of the class in a particular organization, namely, two dispensers associated together (shown at the right). Normally the two dispensers associated together would be placed following subclass 192 because it is merely plural basic sub-

ject matter. However, for the reason that the association of two dispensing containers has so many features in common with the associated dispenser container and nondispenser container, it seemed advisable to keep those two together.

#### 443 *Further Aspects of Division and Arrangement in a Schedule*

Sections 410 through 442 have dealt with the creation of the main subdivisions or first-line subclasses of a class and the positioning of such first-line subclasses with respect to each other in a schedule. Following is a more specific or detailed presentation of aspects of creating and positioning subclasses in a schedule. It is equally applicable in most instances to either the creation and positioning of first-line subclasses or to the creation and positioning of subclasses formed from the further subdivision of the first-line subclasses.

#### 444 *Determining Proper Subclass Order*

As pointed out in prior discussion, the subclasses are created as a result of the analysis of patent disclosures, which analysis indicates the search fields which must be provided. As a consequence of such analysis the Classifier should be able to (1) recognize subject matter that belongs together, (2) appropriately entitle and define a subclass to provide for such subject matter and (3) so position the subclass relative to all others that it will receive adequate original patents.

The recognition of subject matter that belongs together is a skill based on proper analysis of the documents involved and knowledge of search problems and search systems capabilities—as well as knowledge of the subject matter itself. The subject of titles and definitions is presented in Chapter Five.

#### 445 *Factors Which Determine Proper Subclass Order*

There are three main factors which generally must be considered in determining the relative position of subclasses in a schedule: (1) the exhaustive nature of coordinate subclasses discussed in section 406, (2) the fact that subclasses are created from the disclosures of U.S. patents and each should contain some original U.S. patents, and (3) the desirability of limiting the amount of necessary cross-referencing. These three factors must be constantly kept in mind to obtain a workable schedule. Improper arrangement of subclasses may result in no original patents being available to create subclasses required for proper search fields or conversely, it may result in such excessive cross-referencing as to unduly encumber a search. Considerable rearranging of the schedule may be necessary to find the optimum location within a schedule for every subclass needed to adequately provide a specific search field for particular subject matter.

The problem of placement of subclasses is caused by the overlapping nature of one coordinate subclass with respect to another, since each coordinate subclass is selected to solve a different search problem. Otherwise stated: Each coordinate subclass takes all combinations having the characteristics therein provided for except where combined with the characteristics of a preceding coordinate subclass. Each subclass, then, must be so placed in relation to other subclasses as to provide for collecting adequate patents. Improper placement too low in the schedule would mean that the higher subclasses, due to their exhaustive nature, would get all of the patents.

Thus each proposed subclass formed as analysis of subject matter proceeds should be tested as to its placement in a tentative schedule by going through the schedule subclass by subclass and noting if any of the higher sub-

classes actually provide for the subject matter. If they do, then it shows either that the proposed subclass is placed too low in the schedule and should be higher, or that it is formed on a wrong basis and should be modified to eliminate the conflict.

Also, it is necessary to proceed down the schedule beyond the proposed subclass to see if any of the lower subclasses are directed to some more specific aspect of the subject matter under consideration. If so, the lower subclass must be either indented under the proposed subclass or the proposed subclass modified to eliminate the conflict.

When subclasses are shifted about in rearranging the schedule, it is not necessary to be sure that every one of the pertinent patents has been correspondingly shifted. If most of the patents affected by the change are shifted, then a sufficient number will be properly assigned to the correct subclasses to enable evaluations to be made with regard to the relative superiority of the respective subclasses. Any stray patents will be shifted during final revision of the schedule as discussed in section 638.

#### 446 *Effect of Exhaustive Coordinate Subclasses on Arrangement*

Making each coordinate subclass exhaustive as to the characteristic identified by its title and definition will result in all disclosures to combinations which have such characteristic as a part thereof being placed either (1) in some subclass preceding the subclass providing for such characteristic, (2) in the subclass providing for the characteristic, or (3) in a subclass indented thereunder. This principle may best be illustrated by the following example:

- 1 Stand
- 2 Adjustable vertically
- 3 Horizontally movable support surface
- 4 Revolves or rotates about vertical axis

As seen from this example subclass 3 provides for a stand having a horizontally movable support surface. If a patent claims a vertically adjustable stand in combination with the characteristic provided for in subclass 3, a horizontally movable support surface, then—since subclass 2 is exhaustive of all vertically adjustable stands—the patent is assigned to subclass 2, a subclass which precedes subclass 3. If the patent claims only a stand having a horizontally movable support surface, the patent is assigned to subclass 3, the subclass which provides for such characteristic. If however the patent claims a stand having a horizontally movable support surface which revolves or rotates about a vertical axis then the patent is assigned to subclass 4, a subclass which is indented under subclass 3.

#### 447 *Choice of Arrangement*

It can be seen then that a subclass for a combination which includes a particular characteristic may either precede the subclass directed to such characteristic or it may be indented thereunder. This principle may be applied to a specific body of subject matter as follows: Let it be assumed that all the patents in a body of subject matter contains the characteristic A, and some of the patents have this characteristic in various combinations with one or two of the characteristics B, C, and D. One possible arrangement then would be

- (1) A+B+C
- (2) A+B+D
- (3) A+B
- (4) A+C
- (5) A+D
- (6) A

The above arrangement provides adequate searches for the subject matter but in the absence of search notes could probably result in excessive cross-referencing. For example, A+B subject matter in (1) and (2) could be

cross-referenced to (3), the A+C disclosures of (1) could be cross-referenced to (4), the A+D disclosure of (2) could be cross-referenced to (5) and various A disclosures in (1), (2), (3), (4) and (5) could be cross-referenced to (6).

#### 448 *Arrangement for Limiting Cross-Referencing*

Given the same volume of patents, it is possible for the Classifier in the absence of search notes to substantially reduce the number of cross-references required by proper selection and arrangement of subclasses. In each of the following examples proper fields of search are provided for the subject matter but as demonstrated the cross-referencing in each case is reduced significantly. The Classifier must decide in each case which arrangement best satisfies the search requirement for the particular subject matter being classified:

	I	or II
(1)	A with C	(1) A with B
(2)	and B	(2) and C
(3)	A with D	(3) and D
(4)	and B	(4) A with C
(5)	A with B	(5) A with D
(6)	A	(6) A

In I above A+B disclosures (2) and (4) could be cross-referenced to (5) and significant A disclosures in (1) through (5) could be cross-referenced to (6) but a search for A per se in (6) would be complete. In II above the A+C disclosures in (2) could be cross-referenced to (4) and the A+D disclosures in (3) could be cross-referenced to (5) and significant A disclosures in (1) through (5) could be cross-referenced to (6).

However where a large number of documents are available, sufficient to subdivide each combination and more than six sub-

classes are desired, the following arrangement might be preferable:

- A with C  
subdivided on relations between A, C, and B
- A with D  
subdivided on relations between A, D, and B
- A with B  
subdivided on relations between A and B
- A  
subdivided on its features.

#### 449 *Arrangement of Combination Subclasses Indented Under a Subcombination Subclass*

Another arrangement used to limit cross-referencing is as follows:

- (1) A
- (2) with C
- (3) and B
- (4) with D
- (5) and B
- (6) with B

In this example the only cross-references in the absence of search notes would be the A+B combinations in subclasses (3) and (5) which could be cross-references to subclass (6). A search for A, or A combined with a feature not specifically provided for in one of the indented subclasses however must be conducted in all of the subclasses (1) through (6).

#### 450 *Arrangement of Subdivisions of a Characteristic (Genus-Species)*

Subdivision of a characteristic, i.e. different embodiments of a genus (the different embodiments not being related as combination or subcombination) should either precede the generic subclass for the characteristic, or be indented thereunder, in which case the genus subclass is the residual subclass for all species of such genus not specifically provided for in an indented subclass. For example, in a group of patents relating to springs the subclass arrangement could be either:

I  
Coil spring  
Leaf spring  
Spring  
or

II  
Spring  
Coil  
Leaf

#### 451 *Different Modes of Combining Features*

In organizing subclasses, diverse modes of combining the same or similar parts to obtain characteristic combinations unrelated both structurally and functionally (permutations) must be recognized.

The most ready illustrations arise as between classes. A lubricator having a pump as a part thereof (classifiable in the class of Lubrication) as contrasted with a pump having a lubricator as a part thereof (classifiable in the class of Pumps).

Within a single class this same situation may occur. In the class of Dispensing, for example, there appear the following subclasses:

- Gas or vapor dispensing
- 4 With nongaseous material dispensing  
With discharge assistant, e.g., impeller, pump, conveyor, movable trap chamber, etc.
- Fluid pressure
- 399 With gas pressure supplying reservoir

In subclass 4 are placed a liquid dispenser and a gas dispenser, each dispensing separately; for example,  $\leftarrow \boxed{G} \boxed{L} \rightarrow$ . In subclass 399 a gas dispenser delivers gas under pressure to a liquid dispenser, the pressure gas causing the liquid to be dispensed, for example,  $\boxed{G} \rightarrow \boxed{L}$ . These two different modes of combining similar parts were evaluated as rarely being of reference value for each other as to the total combination, which must recognize relations between the elements of the

combination. Thus these are two different combinations, having different overall functions due to different relations between similar parts.

133	Reservoir as handle
135	Collapsible reservoir
136	Resilient
137	Follower
138	Hand feed valve

#### 452 *Subdivision on Basis Appropriate Elsewhere*

It is usually unsatisfactory to subdivide a body of subject matter on a (1) basis appropriate to either another section of the same class or (2) to another class.

As an example of (1), attention is directed to the partial schedule of class 259, Agitating, shown in section 453. Note that subclasses 126 through 138 provide a field of search for stirrers. Subclass 2+ relates to feeding and discharging combinations, but the subclasses indented thereunder are classified on the basis of the stirrer details. Therefor a search of interrelated feeding and discharging means (for example, mechanism by which the discharge means is closed when the feeding means is operative—wherein the various forms of stirrers are frequent equivalents), is long and tedious, invariably requiring search in all of subclasses 2 through 10. In a proper classification system the subject matter of subclass 2+ would be classified on the basis of such relationships, rather than on the details of the subcombination, the basis appropriate to subclass 129+. The subject matter of almost every first-line subclass in this class is classified on the basis of the subcombination rather than on the basis appropriate to the subject matter reflected in the first-line subclasses.

As an example of (2) above the class of Brushing, Scrubbing and General Cleaning, prior to a revision, had the following arrangement of subclasses:

	Implements
130.1	With material supply
131	Implement carried

The group starting with subclass 130.1 was based on hand manipulated instruments involving the combination of a wiper, brush, dauber, etc. with a supply of material to be supplied thereto for application to some surface. Subclasses 131 and 133 were based on the relation of the supply means to the implement. Subclasses 135 through 138, however, were based on characteristics more appropriate to the class of Dispensing. For example, that class provides specific subclasses for collapsible reservoir dispensers, resilient wall dispensers, follower type dispensers, and dispensers, with hand operated feed valves.

Subdivision of the patents in subclasses 130.1+ based on the relation of the supply to the brush, wiper or dauber, for example, the way the material is distributed to the brush, would be more useful because in the combination, the various forms of dispensers are frequently equivalents. A recent reclassification of the subject matter of subclass 130.1+ resulted in 109 new subclasses for some 4,000 original patents. Most of the new subclasses relate to various features appropriate to the relationship of the elements or the proximate utility of the subject matter.

#### 453 *Repetition of Subclasses Based on the Same Feature*

A classification schedule in which the same subclass title appears many times usually does not provide an adequate search for the various aspects of the subject matter classified.

As an example consider the following partial schedule of class 259, Agitating, and note the repetition of the titles "Rotating," "Fixed axis," and "Single stirrers," etc.

Such a classification schedule does not facilitate search. Any careful searcher looking for the subcombination of subclass 133, would look in each of subclasses 7, 22, 42, 65, 106, and 121, a long and tedious search that would involve scanning numerous combinations in which only a conventional form of the subcombination of interest is shown and described, a time-wasting procedure.

Class 259, AGITATING (Partial Schedule)

- 2 FEEDING AND DISCHARGING
- 3 Receptacle rotating
- 4 Receptacle fixed
- 5 Stirrer rotating
- 6 Axis fixed
- 7 Single stirrer
- 8 Vertical, with actuating means
- 9 Horizontal
- 10 With actuating means
- 11 FEEDING
- 18 Receptacle fixed
- 19 Stirrer
- 20 Oscillating
- 21 Rotating
- 22 Single stirrer, axis fixed
- 28 DISCHARGING
- 36 Receptacle fixed
- 37 Stirrer
- 38 Oscillating
- 39 Single stirrer
- 40 Rotating
- 41 Axis fixed
- 42 Single stirrer
- 48 RECEPTACLE PLURAL
- 60 Fixed
- 61 Stirrer
- 62 Oscillating
- 63 Single stirrer
- 64 Rotating
- 65 Single stirrer, axis fixed
- 102 Rotating
- 103 Axis fixed
- 106 Single stirrer
- 116 COVERS AND STIRRERS
- 117 Oscillating stirrer
- 118 Rotating stirrer
- 119 Axis fixed
- 120 Coincident axes
- 121 Single stirrer

- 126 STIRRERS
- 127 Oscillating
- 128 Single stirrer
- 129 Rotating
- 130 Axis fixed
- 133 Single stirrer
- 134 Vertical
- 135 With actuating means
- 136 Horizontal
- 137 With actuating means
- 138 Single stirrer

On the other hand, as pointed out in the preceding section, a search for the interrelated feeding and discharge features is long and tedious. A search for means for proportioning the ingredients fed to the agitator for mixing requires a search through all of subclasses 2 through 10 and 48 through 71. A search for electrical means to heat the agitator receptacle requires a search through all of subclasses 1 through 114.

This character of classification is one form of classification on the obvious discussed in section 454, and does not meet practical search requirements. Many features of combination and relation are omitted thus requiring long and tedious searches for them. To find such features as automatic controls, signals and indicators, timing mechanism, interlocks, mounting and supporting means, etc. which involve various novel relations to the agitator would require long and time consuming searches. The various types of agitators and the various specialized subcombinations thereof are either poorly provided for or not provided for at all.

In some circumstances judicious repetition of a subclass title may be warranted but when carried to the extreme of class 259 it is always undesirable.

A specific example of a proposed classification involving repeated titles, and a subsequent classification that provided more satis-

factory search fields is the following in the class of Dispensing:

*Improper*

- 478 With plural openings or discharge guides  
With container handle or handgrip
- 498 Snap acting outlet element  
With container handle or handgrip
- 505 With relatively movable actuator for outlet  
element  
With container handle or handgrip
- 544 With flow controller or closure  
With container handle or handgrip

*Satisfactory*

- 465 With container handle or handgrips
- 466 Plural handles
- 467 Detachable
- 468 Vent in handle
- 469 Movable handle interconnected with  
flow control or closure
- 470 Handle and actuator for flow controller  
or closure juxtaposed for one-handed  
manipulation
- 471 Non-Pivoted actuator reciprocable  
lengthwise of handle
- 472 Pivoted actuator
- 473 On handle
- 474 Generally lengthwise of handle
- 475 Handle as spout, spout holder or guard

It is evident that the finally selected line of subdivision provides much better search fields than the one first proposed. The relation of a plurality of handles to a dispenser, subclass 466, is usually quite distinct from that of a single handle. Subclass 468 relates to the relation of a handle to dispenser characteristic (vent), as does subclass 469 (interconnected movable handle and valve), subclass 470 (handle and valve actuator juxtaposed for one-hand manipulation), and subclass 475 (handle as spout, spout holder or guard).

#### 454 *The Obvious Is Not a Proper Basis of Classification*

The obvious should usually be avoided as a basis of classification, even though a classifi-

cation system based upon the obvious is usually one in which it is very easy to assign disclosures. In this character of classification, the one filing away a disclosure does not require any particular knowledge of the subject matter. But it is also one that makes a complete search along the lines required in patent matters almost impossible. This is true because the characteristics of structure, relation and function that must be searched in connection with patent matters are rarely obvious at first glance. The combinations having frequent incidence of equivalence are rarely obvious.

A classification that is carefully thought out for the purpose of facilitating a search, that will require the least search time to find all subject matter pertinent to a claimed invention, that brings things together which have frequent patentable equivalence and separates on bases having infrequent patentable equivalence, is difficult to make. After it is made, it also means that the one who assigns a disclosure therein must fully understand the disclosure and must know exactly the invention covered by patent claims.

In fact experience has demonstrated that if a classification system is based on such obvious features that disclosures can be accurately filed away in it with practically no knowledge of the subject matter disclosed, such a classification system is unsatisfactory for search in connection with patent matters.

However, it must be borne in mind that a system is of little or no use if it is so complex that the individuals for whose use it is intended are not capable of understanding it or will be left in confusion as to where to search for or place a patent. It is the responsibility of the classifier in each project to determine the classification schedule which best provides for adequate fields of search but are not so sophisticated as to be incapable of proper use.

#### 455 *All Claimed Characteristics To Be Considered*

When considering claims of U.S. patents for the purpose of creating subclasses it is obvious that a subclass cannot expediently be created for each and every characteristic. The Classifier must select those characteristics which in his estimation best answers the search needs for the particular subject matter involved. However all claimed characteristics should be at least considered as possible subject matter for subclasses. It is only after careful consideration of all claimed characteristics that the Classifier can properly select those appropriate to the subject matter being classified.

As one aspect of the problem of selecting claimed features, the Classifier might incorrectly presume to ignore all characteristics which are questionable as being patentable subject matter, claimed features which are clearly aggregations, or numerous combinations that are allowed where the first patent allowed the exhausted patentability of the combination. However every useful search group that will shorten search time for any feature requiring search should be established.

The mere appearance of the object, while subject matter for a design patent, is not subject matter for a utility patent and is subject to a rejection as a mere difference in appearance. These patents, however, may form a very useful search group. Some patents disclose structure, interrelation among the parts and modes of operation forming patentable subject matter that is distinctive because of the object simulated. For example, the class of Stock Material and Miscellaneous Articles has subclasses as follows:

- 20 Fauna
- 21 Flora
- 22 Tree
- 28 Flower or flower petal

The class of Compound Tools, provides a collecting place for subject matter relating to associations of plural tools. Much of the subject matter is either aggregative in nature or drawn to notoriously old combinations. Despite this, the subclasses provide a useful search field for what appears to be unpatentable subject matter.

#### 456 *Desirable but Difficult Subclasses*

It frequently occurs that the analysis of subject matter to be classified shows that a particular search field is required, but the Classifier in establishing a subclass therefor has difficulty in locating the subclass in the schedule. The reasons for this difficulty are discussed above in section 445. Considerable rearranging of the schedule may be necessary to find the proper location within a schedule for every subclass. A desirable subclass, then, should not be dropped because of the difficulty of locating it in the schedule. The Classifier, upon further study, usually can find an arrangement that will provide for the difficult-to-place subject matter.

#### 457 *Unnumbered Titles Not Permitted*

In a class schedule the practice of using an unnumbered title with one or more subclasses indented thereunder is not now followed. The use of such unnumbered subclasses makes definition cumbersome and difficult in that the limitations and notes that would normally be found in the parent subclass would have to be repeated in each coordinate indented subclass. Further, the use of an unnumbered parent subclass usually requires the establishment of an indented miscellaneous subclass, which practice is inadvisable as pointed out in section 441.

#### 458 *Accessory and Attachment Subclasses*

A subclass entitled "accessory," "attachment," "adjunct" or similar terms should be avoided. The terms are indefinite, incapable of proper definition and are frequently the result of erroneous or incomplete analysis. For example in the class of Brushing, Scrubbing, and General Cleaning there are subclasses as follows:

- 246+ Attachments
- 247 Covers and cover holders
- 257+ Accessories

Subclass 246 is defined as: "Implements, devices, or machines, for brushing, scrubbing, or general cleaning, of types recognized in this classification, and which are constructed for attachment to the article or object upon which they are to operate; also attachments to such implements, devices, or machines acting as collectors, fenders, scoops, or guards or to perform some other auxiliary function."

This definition demonstrates an erroneous and incomplete analysis. The first part states that the combination involves the class apparatus with means to engage the article or object on which the apparatus is to operate. This is a type of combination that should precede the subclasses to the basic subject matter used in the combination. The second part of the definition is similar. It states that it is devoted to devices attached to the class apparatus; that is, collectors, fenders, scoops or guards or other devices to perform an auxiliary function. All of these devices are either AB or Ap combinations and should be provided for as such or subcombinations per se classifiable in another class. As an example of the latter type, covers per se (subclass 247) are subject matter for the class of Cloth, Leather, and Rubber Receptables which has a subclass titled "Covers and cases."

Subclass 257 is defined as: "Devices having of themselves no brushing, scrubbing or gen-

eral cleaning function, but merely accessory or ancillary to processes, machines, or implements involving such function, without falling under any previous specific title in this class." This definition is ambiguous, and erroneous as applied to some of the indented subclasses, for example:

##### Accessories

- 258 Blacking box and brush cases

which was originally defined as: "Kits, cases, or containers having a blacking-box and one or more implements, at least one of which is a brush, distinguished from the devices placed under subclasses 105 to 126 by the fact that normally no implement, or not more than one implement, is exposed for use" and which clearly brought out that a brush was part of the combination.

The error of this grouping is the lack of definite meaning of accessory and the fact that it is used to collect subject matter better treated elsewhere with related subject matter.

As demonstrated, therefore, it is inadvisable to provide for a generic accessory or attachment subclass in any class. The Classifier, should evaluate each variant of such subject matter and determine where it is to be classified either, (1) in his class as a combination or subcombination specialized to the class or (2) in some other class. If it is decided to keep the subject matter, specific subclasses should be established for the unique subject matter rather than attempting to collect the subject matter in a broad attachment or accessory subclass.

#### 459 *Unnecessary Subdivision To Be Avoided*

It is useless to break up a large subclass only because it is large, if such a subdivision does not shorten a search. A searcher may as well inspect all disclosures in one subclass as to be

required to search the same disclosures in plural subclasses.

Separate subclasses should be made only when it is clear that some searches can be made complete in one of the separate subclasses. If every search in any one of a group of subclasses must be completed by searching the entire group, it would be much better to form but a single subclass.

#### 460 *Subdivision of an Oversize Subclass*

During the process of creating and arranging subclasses into a class schedule a subclass that is broad in scope may rapidly receive so many patents as to become cumbersome. To avoid this problem the growth of each subclass should be continuously watched. As soon as a subclass becomes oversize, the subject matter therein should be evaluated for the purpose of subdividing. Where this condition is corrected early, it will save a great deal of work since the disclosures of the patents involved will, at that time, be fresh in mind.

Oversize subclasses may be the result of faulty analysis or faulty synthesis of schedule. For example, a common type of subclass which frequently becomes oversize is a subclass having subclasses indented thereunder, the reason usually being that either there are not enough indented subclasses to provide for all variations of the type provided for in the parent subclass or some of the indented subclasses are abolished before it is clear that they will not receive sufficient patents. Therefore it is imperative during the creation of a schedule to provide for as many variations of a type of subject matter as it is practicable, and also to postpone the canceling of any indented subclass until it is clear that such subclass will not collect sufficient patents to justify retaining the subclass in the final schedule.

#### 461 *Categories of Subject Matter in the Same or Separate Subclasses*

Thus far in this chapter the various problems of subdivision and arrangement of subject matter within a single class have been considered. The general considerations for determining when the categories product, process of making a product, apparatus for practicing the process, stock, intermediate, blank, etc. should be placed in the same or different classes were stated in sections 334 through 339.

When it is determined that some or all of these categories should be in the same class, the question then arises as to whether they should be classified in the same subclasses or in separate subclasses. The following discussion will consider the relationship of these various categories and how they may be treated in a single class.

#### 462 *Product and Apparatus for Making the Product*

A product and an apparatus for making it are sometimes classified in the same class, but should never be classified in the same subclass. The class of Refrigeration, for example, has a subclass titled "Consumable products produced by cooling," and also separate subclasses directed to apparatus for making the products. With respect to all classes, experience has demonstrated that separate fields of search are invariably required for these subjects matter and all attempts to place them in the same subclass have proven to be unsatisfactory.

#### 463 *Product and a Process of Making the Product*

The most usual situation is to classify a product in separate subclasses from that which provide for the process of making the product,

since in the majority of instances the lines of subdivision appropriate to these two categories are different. When the lines of subdivision are the same, however, they should be classified in the same subclasses. In certain cases it may be appropriate in a single class to have areas in which the two categories are classified in the same subclasses and also areas in which the two categories are provided for in separate subclasses. This has been done for chemical compounds and compositions and processes for their production. By way of example, certain subclasses in the class of Organic Chemistry are as follows:

#### CARBOCYCLIC OR ACYCLIC

Esters and Processes of making same

Carboxylic acid

Acyclic

- 488        Unsubstituted acids of the acetic series
- 489        With terpenes
- 490        Alkamine (e.g., choline acetate)
- 491        Esters from esters
- 492        From alkyl sulfates
- 493        From alkyl halides
- 494        Esters from aldehydes
- 495        Esters by dehydrogenation of alcohols
- 496        Esters from ethers
- 497        Esters from olefines
- 498        Esters from acetylene
- 499        Purification or recovery
- 684    PROCESSES
- 685        Sulfurization
- 686        Sulfonation or sulfation
- 687        Oxidation
- 688        Nitration
- 689        Reduction of nitro, nitroso or axomethine groups
- 690        Hydrogenation
- 691        Acylation
- 692        Etherification
- 693        Fusion with alkalis
- 694        Halogenation
- 695        Polymerization
- 696        Unsaturation (e.g., by dehydrogenation)
- 698        Regulatory
- 699        Repression of by-products

- 700        Temperature control
- 701        Chemical purification
- 702        Oxidation of impurities
- 703        Separation from sulfuric acid solution
- 704        Physical treatments only
- 705        With extraction
- 706        With sublimation
- 707        With crystallization
- 708        With absorption (e.g., decolorizing or deodorizing)

Generally in this class the products and processes for their production are classified together. There are indications, however, that this type of subject matter as it develops will eventually require classification of the processes separately from the product as in subclasses 491 through 499. In the field of forming esters from unsubstituted acids of the acetic series containing less than 8 carbon atoms, much work has been done on developing new processes for the production of known compounds. Thus the classification was so developed as to place all novel compounds of this character in subclasses 488 through 490, and to subdivide the processes along lines suitable to the process (and not suitable for the compounds) in subclasses 491 through 499. A further indication is contained in subclasses 684 through 708 of class 260 wherein are collected processes of chemical procedure useful in the production of compounds of two or more types and not restricted to the production of a particular compound. The lines of subdivision are, of course, those pertinent to process and not to compound.

In the class of Coating, Processes and Miscellaneous Products and the class of Textiles, Braiding, Netting and Lace Making, all processes and products produced thereby are classified together because in the great proportion of the cases a complete search must include patents to processes and patents to products.

The class of Textiles, Spinning, Twisting and Twining is an example of separate classi-

fication of product and process of making that is clearly erroneous on mere inspection.

- 139 STRAND STRUCTURE
- 140 Synthetic filaments and/or fibers
- 141 Endless bands
- 142 Splices
- 143 Chenille
- 144 Covered or wrapped
- 153 Coated or impregnated
- 154 Web material
- 155 Web material
- 156 PROCESSES
- 157 Synthetic filaments and/or fibers
- 158 Endless band forming
- 159 Splicing
- 160 Covering or wrapping
- 164 Coating or impregnating
- 165 Web material
- 167 Web material

The products are in subclasses 139 through 155 and the processes in subclasses 156 through 168. A comparison of these two groups of subclasses shows the lines of subdivision to be the same (e.g. compare subclasses 140, 157; 141, 158; 142, 159; etc.). If the lines of subdivision of both are proper, classification should have been together. No useful purpose is served by having separate subclasses. In each case the pair of corresponding subclasses must invariably be searched.

#### 464 *Process and Apparatus for Its Practice*

A study of recently created classes indicates that in most cases where a process and apparatus for its practice are in a single class they can be separately provided for in separate subclass. Careful analysis of the subject matter frequently suggests search fields not common to both groups.

In most instances a process has been found to subdivide along lines different from an apparatus for its practice. For example the processes in the class of Abrading are subdi-

vided for the most part on the basis of the article being ground. In the class of Metallurgy the processes are based on the character of the material treated, the particular product produced, or the treating medium. In all of these, the basis of classification is inappropriate to apparatus subclasses. The Classifier then should consider the subject matter carefully to determine which features if any must be grouped together in the same subclass. Some but not all of the factors which would influence the Classifier to group process and apparatus for its practice together are as follows:

- (1) A great proportion of the patents have claims to both apparatus and process.
- (2) The process claims appear to recite the mere function of the apparatus or the manipulation of the particular structures.
- (3) The subject matter is relatively recent and developing, and insufficient patents are available in one or the other of the two categories to provide for adequate search fields.

In the class of Earth Working, the first subclass is "Processes" and therefore all the processes of the class are separate from the apparatus. The class of Boring or Penetrating the Earth, however, provides 56 subclasses for both apparatus and methods before the first-line subclass limited to processes. The last 350 subclasses of the class provide for apparatus. In the class of Nuclear Reactions and Systems all subclasses provide for apparatus and processes, and (4) Note in the definitions of the class states, "Patents to processes are not segregated from patents to the structure, but are classified together depending upon the type of structure claimed or used in the claimed process." In that class the process claims generally relate to manipulations of particular ap-

paratus and no distinctive subclasses could be established for the separate groups.

#### 465 *Compositions, Stock, Blanks or Intermediate Products*

Materials (compositions of matter, chemical compounds, stock material, blanks and intermediate products) are classified separately from the processes and apparatus in which they are used and the products to which they may be converted when classified in the same class with these three latter categories. These materials generally may be used in a variety of different processes and bear little relationship to the apparatus in which they are treated. These materials are usually of general utility and not limited to a particular final product.

#### 466 *Superiority of Arrangement of Different Categories of Subject Matter*

It frequently happens that it is desirable to provide separate subclasses for two or more different categories of subject matter in a single class as stated above in section 463+. When this is done, the positional relationship of the various categories should be as follows:

- (1) Process (of using product 2)
- (2) Product of manufacture
- (3) Process (of making product 2)
- (4) Apparatus (to perform 3 or to make 2)
- (5) Material (used in 3 to make 2)

This list is arranged in the order that the subclasses should appear in the class schedule. Thus subclasses to a process of using a product should be placed in a class schedule ahead of subclasses to the product. Subclasses to a product should be placed ahead of subclass directed to processes of making the product, etc.

#### 467 *Summary of Principles Relating to Creating a Single Class*

##### EXHAUSTIVE DIVISION—MISCELLANEOUS SUBCLASS

The subdivisions or subclasses of a class in aggregate should be exhaustive, that is, they should be susceptible of receiving any future invention that may fall within the scope of the class. Exhaustive division is secured by the presence of a residual or miscellaneous subclass.

##### EXHAUSTIVE NATURE OF COORDINATE SUBCLASSES: COMBINATIONS TO PRECEDE SUBCOMBINATIONS

Coordinate subclasses must each be exhaustive of the classification characteristic for which the subclass title and definition provides. That is, no subsequent coordinate subclass—nor any subclass indented thereunder—should provide for the characteristic of an earlier appearing coordinate subclass. Thus, in coordinate relationship, combinations including a detail must precede subcombinations to the detail, per se. A subsequent subcombination subclass receives disclosed combinations—which in their entirety are provided for in a preceding subclass—where only the subcombination is claimed; the disclosed combination is cross-referenced, if appropriate, to such preceding subclass.

##### INDENTATION OF SUBCLASSES

A. A class schedule is arranged with certain subclasses appropriately indented. In a properly indented schedule, subclasses in the column at the extreme left are the main variants (referred to as a “first-line subclasses”) of the class. The titles and definitions of all these first-line subclasses must be read with the title and definition of the class, as if indented one space to the right under the class title.

B. A subclass having indented subclasses under it represents a subject divided into variants. Such subclass also includes other variants not comprehended by the indented variants.

C. If no genus subclass is provided for the concepts of several subclasses which are in fact variants of a genus, the several subclasses should be positioned in the same area of the schedule where possible, as though they were indented under the unprovided-for genus.

#### DIVERSE MODES OF COMBINING SIMILAR PARTS

The classification system must recognize and provide for diverse modes of combining the same or similar parts or steps to obtain functionally (and possibly structurally) unrelated combinations.

#### RELATIVE POSITION OF SUBCLASSES

The relative position of subclasses in a single class is determined by the following principles:

A. Characteristics deemed more important for purposes of search generally should be provided for in subclasses that precede subclasses based on characteristics deemed less important. However, some subclasses of lesser importance may require precedence of position to avoid their loss from the schedule.

B. Subclasses based upon effect or special use should precede those based upon function or general use.

C. Subclasses which are directed to variants of a concept should either be indented under the subclass directed to such concept or precede the same, and should not form or be part of a subsequent coordinate subclass or group of subclasses.

D. Subclasses directed to combinations of the basic subject matter of the class with means having a function or utility unnecessary for or in addition to the function or utility of the basic subject matter should precede subclasses devoted to such basic subject matter.

## *Title, Definition, Notes and Cross Referencing*

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### 500 *Introduction*

This chapter deals with the means of identifying the product of a classification project—the titles, definitions and notes of a class and subclasses—and with the subject of cross-referencing, which, due to its relationship to the subject of search notes is discussed herein.

### 501 *Title, Definition, and Notes*

A class or subclass consists of a definite group of documents divided from a larger group of documents in accordance with the principles set forth in the preceding chapters. Such a class or subclass must be given some form of identification to distinguish the same

from all other classes or subclasses in the system. The title, definition and notes serve this purpose. The title of a class or subclass is the name given to describe the subject matter in the class or subclass. The definition is an elaboration of or a further explanation of the title. The notes point out relationships between the class or subclass and all other classes or subclasses in the system and may be of two types (1) explanatory notes and (2) search notes. Title, definition and notes will now be discussed in detail.

### 502 *Title*

At the beginning of the project, a tentative title is chosen to represent the concept of the class to be created. As the analysis of the subject matter progresses, the Classifier makes a schedule by subdividing the subject matter and by assembling the various subdivisions made in a sequence and assigns a title to each such subdivision made. The title of the class and the title of each subclass must be as concise, explicit and descriptive as possible. In other words, the title selected must reflect, as accurately as possible, the subject matter placed under that title. This involves a nice arbitration. A long and involved title, even though quite exact, is difficult to read and poses a space problem in printed form. A short title is easy to read but, if essential limitations are omitted, may be misleading. The Classifier must avoid these extremes. The Classifier should devise a title as short but as suggestive of the subject matter as possible. However, the title must be used in conjunction with the definition and the notes for a complete description of such subject matter.

### 503 *Use of Industrial or Trade Terminology*

Where industrial or trade terminology for the subject matter of any class or subclass is fairly fixed and accurate in meaning, it should

always be used in the title. For example, the class of Refrigeration, has the following subclass:

Compressor-condenser-evaporator circuit.

In many instances trade terminology has developed which applies the same name to things that are essentially different. In such situation terminology properly descriptive of the subject matter collected must be developed. For example, the term "mills" is widely used to designate many diverse and essentially different types of manufacturing plants. Thus the class made from the old class of Mills is entitled "Solid Material Comminution or Disintegration." This title was selected as suitable to connote the basic subject matter of the class: namely, the breaking up of large solid bodies into smaller pieces without any attempt to impart particular shape to the smaller pieces.

In some instances trade terminology has been developed to designate some, only, of the subject matter collected together. In such instances, though still necessary to select a title appropriate to the subject matter, it is frequently advisable to utilize the trade term, as an example, in connection therewith. For instance, the class of Solid Material Comminution or Disintegration includes the following subclasses:

- Rolls frictionally driven and supported by relatively moving surface (e.g., ball chasers)
- Plural rotary or oscillatory surfaces cooperate with common surface (e.g., chasing mills)
- Loose grinding body comminutor (e.g. ball or rod mills)
- Rotary striking member (e.g. hammer mills)

The class of Chemistry, Carbon Compounds includes the following subclasses:

- Vulcanizable natural hydrocarbon gums
- Pore-forming (e.g., sponge rubber)
- Reaction products and processes for preparing same
- Sulphurized (vulcanized)
- Dispersions (e.g., latex)

#### 504 *Title To Be Changed With Changes in Subclass Scope*

A subclass title selected originally to apply to certain subject matter grouped thereunder is generally subject to change as a project progresses. For example, some subject matter is originally grouped together to form a proposed or tentative subclass and an appropriate title selected to designate the same. Later, additional subject matter is found which is best classified with the subject matter in the proposed subclass. The original title, however, excludes the added material. Should that added subject matter be placed in the subclass without changing the title appropriately, the resultant misdescriptive title will, through constant use, acquire a special meaning to the Classifier doing the work, which meaning it will have to no other person. This must be avoided. It can be avoided only if the Classifier keeps alert and appropriately modifies the title every time he in fact varies the scope of a subclass.

#### 505 *Guidelines for Writing a Class or Subclass Title*

The following represents guidelines which should generally be followed in writing a class or subclass title. Some of the guidelines are more applicable to either a class or subclass title and will be so designated. Those not so designated are generally applicable to both a class and subclass title.

(1) A title should be short but as suggestive as possible of the subject matter encompassed by the title.

(2) A class title should be written in general technical terms, but should not be so limited to technical terms of the subject matter under consideration as to mislead a searcher who is not thoroughly familiar

with such subject matter and the terminology used in connection therewith.

(3) A title for a grouping of subject matter directed to an operation designed to make a product, and which may include the process, and apparatus for making such product is usually participial in form, for example, "Glass Manufacturing" is the title for the class which includes both processes and apparatus for making glass. Further subclass 1, of this class titled "Filament or fiber making" includes both processes and apparatus for making glass filaments or fibers. For the schedule of the class of Glass Manufacturing, see Appendix I.

(4) A title for a grouping of subject matter directed to a special use, purpose or object made or treated usually contains the name of the special use, purpose or object made or treated. For example, subclass 142 of the class of Glass Manufacturing, titled "Particulate bead or ball making apparatus, e.g., pin heading" is limited to apparatus for making glass beads or balls and therefore the name of the specific object made is included in the title.

(5) A title to a type of apparatus usually includes a name with a qualifying adjective, for example subclass 253 of the class of Glass Manufacturing titled "Rolling means to form sheet or strip" describes a specific type of means, that is, a rolling means, for forming a sheet or strip of glass.

(6) A title for a product, (e.g., element, tool or material) is usually a name. For example, subclass 362 of the class of Glass Manufacturing titled "Plunger" is directed to a male element or tool per se adapted to cooperate with a female mold member.

(7) A title should be written in singular form, since the class or subclass which the title identifies is directed to a particular concept and although the concept may have several variants, it is nevertheless a single

concept. Further the U.S. Patent Classification System is an inclusive classification system and the naming of a means inherently includes one or more of such means. As an exception to this guideline, custom and usage in some instances may justify writing a *class* title in plural form.

(8) Where a term in a title is to be limited to denote a single feature element or concept the expression "only" must be used in the title, for example, the title "Plural tools useable alternately only," indicates that the plural tools can only be used alternately, that is, under no circumstances can they be used simultaneously.

(9) The expression "and/or" should not be used in a title. Instead the expression "or" should be used to indicate either an alternative or a combined alternative and addition. For example the title, "With means to heat the tool or work" would encompass means to heat either the tool or the work or means to heat both the tool and the work. The first situation is obvious since the expression "or" specifically indicates the alternative. The second situation is inherent due to the inclusive nature of the U.S. Patent Classification System, that is, this title includes means to heat the tool and anything else which is not specifically excluded, which includes the work.

(10) The conjunction "and" should be used to join two words or terms in a title only when the concept of the subclass includes a combination of both of the features represented by the words or terms. For example the title, "By slinger and fluid blast means" indicates that patents placed in the subclass identified by this title must include both the slinger means and the fluid blast means.

(11) Due to the inclusive nature of the U.S. Patent Classification System, "(s)" at the end of a word or term in a title must

not be used. For example, a title such as "Motor(s) controlled valve(s)" is improper. Since the U.S. Patent Classification system is inclusive, a word or expression denoting a means includes either one or more of such means. Where, however, it is intended to limit the word or term to more than one means, the word or term is pluralized.

(12) Generally the only justification for using quotation marks around a word or expression in a title is when such word or expression is a registered trade mark or trade name. If quotation marks are used in a title for any other purpose, the necessity for using the same must be clearly explained in the class or subclass definition, whichever the case may be.

(13) There should be no portion of a title included within parentheses except either an "i.e." or an "e.g." expression, and these expressions should always be delineated from the remainder of the title by parentheses.

(14) The expression "e.g."—which should only be used on rare occasions in a title—should be used merely to indicate a series of examples and should terminate with "etc.", even though only a single example is listed.

(15) The word "with" in a title should be used solely to indicate a subclass directed to basic subject matter combined with subject matter of another class either as a perfecting feature (Ap) or as a feature for performing a different function (AB). In entitling subclasses directed solely to basic subject matter or subcombinations thereof, the expressions such as "and", "having", "including", etc. should be used rather than "with".

(16) Where a word used in a title or definition has been defined in the glossary of a class definition an asterisk may be placed after the word to so indicate. In such case

the asterisk is to be used to call attention to a footnote that is to state that the word is defined in the glossary of the class definition.

### 506 *Definition*

The definition of a class or subclass is supplementary to the title as a means for identifying the subject matter of such class or subclass. The definition of a class or subclass is a statement setting forth the properties and circumstances possessed by all the subject matter that is intended to be included in the class or subclass and not possessed completely by any other subject matter. If the subject matter has a peculiar property, the naming of said property may be sufficient to distinguish such subject matter from subject matter of another class or subclass. If the subject matter has no single peculiar property, the definition should name more than one property thereof. Subject matter forming the basis of several different classes or subclasses may have one or more properties alike, but as the number of properties recited in a definition is increased, the likelihood of other subject matter having all the recited properties is decreased. Thus a definition of either a class or subclass generally consists of the briefest statement possible of the least number of properties which are possessed by all the subject matter of a class or subclass and not completely possessed by any other subject matter.

### 507 *Class Definition*

A common type of project involves the reclassification of a large body of subject matter, usually taken from an existing class which is to be abolished, and creating another class. This requires writing a definition for the proposed

new class which definition is referred to as the class definition.

Having some knowledge of the nature of the subject matter about to be reclassified, a tentative class definition of the class to be created must be written. This tentative definition will constantly be subject to change as better knowledge of all the subject matter to be reclassified is obtained.

A class definition fundamentally identifies the subject matter which is allowed entry into the class. It further sets forth the relationship to all other related classes in the system.

A class may be distinguished from other classes by having all of the features peculiar thereto different from all the features of another class. It may be distinguished from other classes by having only some features, less than the total number of features, different from the features of another class. A situation in which two classes are distinguished by having all the features peculiar to each class different from each other is illustrated, for example, by the class of Tools and the class of Land Vehicles. Each of these classes is a separate entity having no common feature or characteristic, and the definition of each of these classes includes no feature or characteristic common to both. A situation in which two classes are distinguished by having only some features less than the total number of features different from each other, may be illustrated by classes which bear a combination subcombination relationship to each other, for example, the class of Motor Vehicles is distinguished from the class of Land Vehicles by the added feature of a motor. The definition of each of these classes include the common feature of both, namely a land vehicle, the definition of the Motor Vehicle class reciting in addition thereto the motor feature.

In those classes which, in addition to the basic subject matter of the class, contain combinations for an additional purpose, such as

perfecting combinations and subcombinations of the basic subject matter, the class definition must explain each of these to the extent necessary to give a clear understanding of the scope of the subject matter of the class.

A class may encompass one or more up to all of the following categories of subject matter namely, product, process, apparatus and material (composition, stock, blank or intermediate). Where two or more of these categories are present, separate sections of the class may be provided for each, or two may be classified together, with a separate section of the class for a third, etc. A clear statement must be made in the class definition as to the various categories of subject matter encompassed within the class and the relationship of each relative to similar subject matter in other classes.

### 508 *Subclass Definition*

As the patents are collected into groups, and such groups appear to have merit as subclasses, the Classifier must immediately reduce associated ideas and notations, into a title and tentative definition thereof. It may be advisable to wait until there is reasonable indication that a study group has lasting merit before expending the time to draft its definition. This avoids the time loss involved, if the group is later abolished. However experience has shown it to be desirable to write a title and tentative definition too early rather than too late. The ability to draw a proper definition for a tentative subclass is in itself a test of the merit of the subclass. Inability to draw an informative definition is often an indication of lack of merit in the proposed subclass (see the discussion of a subclass titled "special" in section 414). Clearly, a first or tentative definition is a rough draft. The final form is to be at-

tained by frequent revision as the project develops and more information is obtained.

A subclass definition must particularly point out and distinctly describe the metes and bounds of the subject matter included in clear and concise terms. It may be expressed as a means or step for performing a specific function without recital of structure, material, or acts in support thereof. Such a definition is construed to cover the corresponding structure, material, or acts described in the claimed disclosures and all the equivalents thereof.

It is necessary that a subclass definition should be as precise and specific as possible so as to set the limits of the subclass. Comments specialized to notes to subject matter in other subclasses will appear in later sections devoted to notes. It is, however, emphasized that notes to related subject matter in other subclasses are an important and necessary corollary to a definition.

### 509 *Definition Should Not Be a Mere Repetition of the Title*

As pointed out in section 501, the purpose of a definition is an elaboration of or a further explanation of the title. To serve this purpose it cannot be a mere repetition of the title. In a class, for example, having the following subclasses:

- 1 Mechanical movements
- 2 Rotary to or from reciprocating or oscillating
- 3 Crank pitman and slide

A definition for the subclass entitled "Crank pitman and slide" which states "Mechanisms under subclass 2 including a crank pitman and slide" would be of no value since it does not elaborate upon or further explain the title. Such a definition serves no useful purpose and must be avoided.

### 510 *Improper to Define a Title in Terms of Itself*

A title should never be properly defined in terms of itself. A class at one time had the following subclasses:

Apparatus  
Furnaces  
Rotary

The definition of the subclass entitled "Furnace" reads as follows: "Apparatus under subclass \* \* \* which are furnaces for carrying out a chemical reaction and is not provided for in any other class." The definition of the "Furnace" subclass failed to state the elements and the relationships therebetween which were necessary to constitute a furnace. The definition of the subclass "Rotary" was "The title is self-explanatory." This latter definition was ambiguous in that it attempted to define in terms of the title itself rather than stating whether there was relative rotation between parts of a furnace or whether the entire furnace rotated with respect to something other than furnace structure.

### 511 *Superior Subclass Need Not Be Excluded*

In any properly organized class schedule, each first line subclass is exhaustive as to the characteristic that distinguishes it and is peculiar thereto, and such characteristic is never a part of any subsequently appearing co-ordinate subclass (see section 406 which describes the exhaustive nature of coordinate subclasses). All subject matter within the class having such distinguishing characteristic must be in that subclass, a subclass indented thereunder or in some preceding and superior subclass.

The attempt to define a subclass so as to exclude all subject matter of either a preceding or an indented subclass is a waste of time. The infinitude of possible combinations makes this almost impossible and an attempt to do it makes the definitions so complex and cumbersome as to reduce or destroy their utility. Positional superiority in a properly organized class schedule conveys more complete information than will paragraphs of verbiage.

### 512 *Terms Should Be Defined, Graphic Representations of Typical Structure May Be Used*

In connection with the definition of any class or subclass, it is sometimes necessary to define terms used which do not have a precise accepted and generally understood meaning. See, for example, Part II "GLOSSARY", of the class definition of the class of Glass, Manufacturing, in Appendix II.

The definition of a subclass may include specific examples of the type of subject matter generally encompassed by said subclass. This is not incorporated in the definition itself, but is set forth in a note appended to the definition. The following illustrates this practice. The class of Plastic and Non-Metallic Article Shaping or Treating: Processes, has a subclass titled "Vitrifying or Sintering of Preform to Make Inorganic Article," with the following definition and note:

"Processes under class definition in which a shaped article or a self sustaining preform comprising inorganic materials are subjected to temperatures sufficiently high to cause said article or preform to become fused, sintered or vitrified.  
*Note:* The materials molded may be, for example, clays, ceramics or silica containing."

As seen, specific examples of subject matter included in this subclass—clay, ceramics or silica containing—are set forth in a separate note.

Another mode of citing examples of subject matter in a subclass is to use graphic representations of typical structure as exemplified in the definitions of subclasses 157 through 163 of the Class of Chemistry, Carbon Compounds and subclasses 32 and 33 of the class of Electricity, Motive Power Systems (see Appendix II). However, such showing must in fact be typical and exemplary of an underlying discriminating feature of a particular subclass.

### 513 *Guidelines for Preparing a Definition*

In writing and subsequent refining of a definition the following guidelines are helpful:

(1) Avoid non-sequitur; be sure of the existence of a proper antecedent or use "a" and not "the"

(2) Avoid reference to another subclass or class in the body of a definition, except in reference to a subclass under which the subclass is indented.

(3) Do not repeat a limitation stated in the definition of the subclass under which the subclass is indented.

(4) Try not to rely on a glossary to define elemental basic subject matter. The subclass definition should explain the facets of this subject matter.

(5) Avoid using "at least one". Instead use "a", for example, use a "movable leg" not "at least one movable leg".

(6) Avoid using "claimed" or "claimed disclosure" in definitions or notes, since assignment of the original patent in the U.S. Patent Classification System is on the basis of "claimed" disclosure.

(7) Avoid the use of "while"; use "simultaneously" or other more definite words or phrases.

(8) Avoid using negative limitations in a definition such as, for example, "subject matter xyz is excluded from this subclass".

(9) The antecedent for the terms "there-

in", "thereto", "therefrom", etc., must always be unmistakably clear to avoid ambiguity.

### 514 *Subclass Title and Definition Comprehend Title and Definition of Subclass Under Which It Is Indented*

A class title and definition is a necessary part of every subclass title and definition. Similarly the title and definition of an indented subclass comprehend the titles and definitions of every subclass under which it is indented. This is true because a class embraces within its scope a specific body of subject matter, and all of this subject matter must be included within the terms of the class definition. Every subclass in turn embraces within its scope a portion only of the subject matter which constitutes the subject matter of the class. Every subclass indented under another subclass in turn embraces within its scope a portion only of the subject matter which constitutes the subject matter of the subclass under which it is indented. The relationships expressed have been likened to a family group arrangement, each first line subclass being indented under and comprising a portion of subject matter of the class, and each subclass indented under such first line subclass comprising a portion of the subject matter thereof. Thus the class is a parent to all the subclasses in the class, and a subclass is a parent to all subclasses indented thereunder. This may be illustrated by the following example:

The class of Tobacco has the following subclasses

- 1 Products
- 8 Cigars and cigarettes
- 9 With smoke treating means

In this example, the complete title of subclass 9, in the class of "Tobacco Products, Cigars and Cigarettes, With Smoke Treating Means". Thus, in assigning patents to this

subclass, limitations of the parent subclasses must be taken into consideration. The definition of an indented subclass similarly is a composite of the limitations expressed in the subclass definition and the limitations expressed by a parent subclass, if any. Indented or dependent subclass definitions are written in the style of dependent claims, for example, in the class of Tobacco, subclass 9, the definition reads, "Products under subclass 8, embodying . . ."; the definition of subclass 8, reads, "Products under subclass 1 in the form . . ."; and the definition of subclass 1 reads, "Products coming within the class definition . . .". In construing the scope of subclass 9, all limitations recited by the class definition and the definitions of subclasses 1, 8 and 9 must be included.

### 515 *Notes*

Notes are of two types, (a) explanatory notes that supplement definitions (e.g., definition of terms, examples, graphic representations of typical structure) and (b) search notes to related subject matter found in other classes and subclasses.

### 516 *Explanatory Notes*

Sometimes it is necessary to further explain some term, expression or phase used in a class or subclass definition to state that certain subject matter is included in a class or subclass (although the inclusion of such subject matter is not readily apparent from the definition) to state that certain principles were not followed in a particular instance, to set forth other statements intended to clarify the definition, or to point out more clearly the subject matter intended to be included under the definition of such class or subclass. Such notes

may be used either in the class definition or in a subclass definition, and should be used wherever found appropriate or necessary.

### 517 *Search Notes: Line Notes*

Notes to related subject matter that are associated with either a class definition or a subclass definition are generally called search notes. Since they refer to subject matter which is in some manner related to the class or subclass to which they are appended, they are of great benefit in qualifying and explaining the limits of the class or subclass. It is substantially impossible in any class or subclass to so define its contents as to necessarily exclude all related subject matter elsewhere classified. A properly written search note to such related subject matter is invariably better than several paragraphs of definitions. See the search notes under "SEARCH CLASS" in the class definition of the class of Glass Manufacturing, in Appendix section II.

Search notes, properly written, will inform the searcher where related subject matter will be found and also the line of distinction between classes and subclasses.

To perform these two functions, search notes, whether appended to a class or subclass definition, must state not only where the related subject matter is to be found but also the relationship, expressing both the similarity to and the difference from the class or subclass to which the note is appended. When both of these aspects appear in a search note, a line of distinction with related subject matter is clear. Obviously, the notes need not identify statements pertaining to similarities and those pertaining to differences, but each of these facets should be recognized by each note.

A note stating "certain subject matter is not in this class or subclass" without stating where

it is should be avoided. If such a note is believed to be necessary, all possible effort should be made to identify the location of the search for the excluded subject matter.

### 518 *Character of Subject Matter To Be Noted*

Every project presents different problems to be solved, and no specific principles can be stated for determining the type of search notes which can be written in all situations. The notes have to answer, fully and completely, all reasonable questions that a searcher may pose in connection with a search for subject matter encompassed by or related to the class or subclass wherein the note exists.

What constitutes related subject matter for the purpose of writing search notes is a problem to be solved separately in each case. No set of rules can answer it for the Classifier. Related subject matter may be of any character; for example

- Combination—subcombination
- Product—process of making
- Process—apparatus for its practice
- Genus—a subgenus within the genus

Search notes may also be used to exclude subject matter not having any reference value for the subject matter in a class or subclass but which due to inadequacies of language might otherwise be considered to be included within the title and definition of such class or subclass.

### 519 *Collection of Search Notes on Particular Subject Matter in One Place*

At various places throughout the classification system, search notes on particular subject matter are collected. For example, search notes on measuring and testing are collected and appended to the class definition of the

class of Measuring and Testing. Wherever there is such a collection of search notes, which search notes are pertinent and of interest to many classes or subclasses, a direct reference is made thereto but the search notes are not repeated.

### 520 *Search Notes in a Class Definition*

The following considerations are useful in determining what search notes should be placed in the class definition.

- (1) Where a class title is so broad as to include types of subject matter excluded by the class definition and classified in other classes, the notes in the class definition of such class should clearly point out the other classes in which such excluded subject matter is classified. For example, the title of the class of Measuring and Testing is broad enough to include all types of Measuring and Testing. However, electrical and chemical testing of various types are classified elsewhere. The notes in the class definition of the class of Measuring and Testing must clearly indicate where such electrical and chemical measuring and testing subject matter is classified. A second illustration involves the class of Furnaces. The term "furnace" has two widely accepted meanings: (a) an enclosure specially designed for the generation of heat, and (b) the combination of the heat generating means, (a), with means for applying that heat to the material, or object, to be heated. The term "furnace" as used in the Class of Furnaces, is not only restricted by the definition of such class as in (a), but is further restricted to the structures required for the combination of fuel burning means with means for applying that heat. The latter type of subject matter is provided for in

numerous other classes such as boilers in the class of Liquid Heaters and Vaporizers, certain heating apparatus in the class of Chemistry, stills in the classes of Mineral Oils: Apparatus; and Distillation, heating apparatus in the classes of Heating, Metallurgical Apparatus, Glass Manufacturing, etc. The class of Furnaces also excludes electric heating of the types provided for by the classes of Electric Furnaces and Electric Heating. The notes in the definition of the class of Furnaces therefore must clearly point out these other classes and their relation to the class of Furnaces. This provides the searcher with a complete statement as to the location of all types of subject matter embraced by a broad class title, but classified in some other class.

(2) Combinations in other classes, of which the class subject matter is but a part, may be noted in the following manner:

(a) A generally applicable note may be written, as set forth in the class definition of the class of Measuring and Testing which states in substance that measuring and testing means combined with a fabricating device and operating to automatically control the same is classified with the fabricating device.

(b) A collection of notes specifying particular classes and subclasses which provide for combinations, of which the class subject matter is but a part, may be prepared.

(3) Notes to other classes and subclasses that take subcombinations of the class subject matter may also be provided in the class definition. For example, a class providing for grinding machines could have a search note to the class of Machine Elements and Mechanisms, which provides for subject matter which forms subcombinations or elements of such machine. For an illustra-

tion of search notes in a class definition see the search notes under "SEARCH CLASS" in the class definition of the class of Glass Manufacturing, Appendix section II.

A note from a combination class to a subcombination class as set forth in (3), must be written with great discretion because generally classes directed to subcombinational features can be found by referring to the Index To Classification. For example, it is generally not necessary in a class of wooden boxes to point out where the nails, screws, hinges or locks that form part of the box are classified.

### 521 *Search Note in a Subclass Definition*

It is rarely necessary to refer to subclasses within a class in a search note appended to the class definition of that class. However search notes from one subclass to another in the same class or in a different class are very extensively used both to point out related subject matter that should be searched and to limit cross-referencing.

A search note is appropriately appended to a subclass definition in any of the following situations:

(1) In each of two subclasses in the same or separate classes to cross note subject matter which is related in structure and mode of operation but which is separated on a different functional basis.

(2) Where two coordinate subclasses have a combination—subcombination relationship and the subcombination subclass title consists of the identical terminology of a portion of the combination subclass title or a subclass indented thereunder, a search note is provided only in the subcombination subclass referring to the combination subclass or the subclass indented thereunder.

(3) Where two coordinate subclasses have a genus-species relationship, with the

species subclass appearing first in the schedule, a note referring to the species subclass is provided in the genus subclass only.

(4) Where there are two subclasses in the same or separate classes one of which contains a voluminous amount of patents having disclosures directed to subject matter which could be cross-referenced to the second subclass, a note is provided in the second subclass referring to the other.

## 522 *Contents of a Class Definition*

The form and contents of a class definition is a special problem in each case. Attention is called to the class definition of the class of Glass Manufacturing and of the class of Motors, Expandable Chamber Type (see appendix II). In general, the class definition must include a description of the subject matter and the following:

- (1) Definitions of terms used.
- (2) Explanatory notes if required, such as, for example, statements that process and apparatus or process and product are classified together.
- (3) Special sections on variant embodiments elsewhere classified, combinations of which the class subject matter is but a part elsewhere classified, subcombinations of class subject matter elsewhere classified.
- (4) Search notes to other classes collected under "SEARCH CLASS" and arranged in class number sequence.

For orderly presentation of the above contents the following arrangement is one of several which might be used:

- a. Table of Contents
- b. Statement of general subject matter of class
- c. Glossary of terms

d. Relationships with other classes having similar subject matter

e. Relationships to combination classes

f. Relationships to subcombination classes

g. Relationships to other classes

h. An index of all classes referred to either in the class or subclass definitions

i. Exceptions to general principles of patent assignment

Section b is mandatory. Sections d through g, are also mandatory either as separate sections as shown above or combined into a single section under "SEARCH CLASS". Section a, c, h, and i may be used whenever applicable or necessary. Unnecessary elaboration of the class definition is to be avoided. A simple, concise, but complete presentation is the most effective.

In setting forth the subdivisions of these sections of the class definition it is desirable to use the so-called alphanumerical system by successive indentations, after the Roman Numeral, of Capital letter, Arabic numeral, and lower case letter, in that sequence; e.g. IV, B, 3, a. As a matter of space conservation, indentation ordinarily should not go beyond the fourth place, or lower case letter column. For an illustration of the above see section II of the class of Glass Manufacturing in Appendix II.

## 523 *Contents of a Subclass Definition*

The contents and form of a subclass definition also present a special problem in each case, but generally must include a description of the subject matter of the subclass and may include one or more of the following:

- (1) Explanatory notes, graphic representations of typical structure and definitions of terms used.

(2) Special notes, such as, for example, line notes that require reference to two or more other classes in the same statement.

(3) Search notes to other subclasses within the class collected under "SEARCH THIS CLASS, SUBCLASS" and arranged in subclass number sequence.

(4) Search notes to other classes collected under "SEARCH CLASS" and arranged in class number sequence.

#### 524 *Amending Titles, Definitions and Notes*

Titles, definitions and notes should be amended immediately whenever subsequently found subject matter or new information has indicated deficiencies therein or other Classifiers have had difficulty in understanding them. Amendment of a working number (see section 628 for the definition of working number) title and definition generally must be approved by the Classifier in charge of the particular project. Verification of titles and definitions as the schedule develops and the incorporation of comments and suggestions by other Classifiers on the project is imperative. Flaws in the system being created are often detected by the difficulty in obtaining conformity between the subject matter in a subclass or group of subclasses and the titles, definitions and notes thereof. Some of these flaws may be capable of simple correction or adjustment, while others may be such as to require abandonment of the subclass or subclasses in favor of a different mode of division.

#### 525 *Review of Titles, Definitions and Notes*

All titles, definitions and notes written by a Classifier should be reviewed before publication by at least one person having a general knowledge of the subject matter being classified. This review is best accomplished after

final schedule revision by assigning a Classifier, other than the writer, to check the schedule and definitions. This review should be thorough and constructive. If two knowledgeable people arrive at a common understanding of titles, definitions and notes, the others having at least a general understanding of the subject matter will ordinarily derive substantially the same meaning therefrom. Experience has taught that titles, definitions and notes which are not reviewed by someone other than the writer thereof are often subject to misconstruction.

The titles must further be reviewed for conformity of terminology and to eliminate unnecessary verbiage. This is done just prior to the publication of the schedule and by several of the Classifiers who worked on the project. Each title is scrutinized to ascertain that common terminology appearing in two or more titles is consistent in meaning and to eliminate any unnecessary words in the title to make the title as short and concise yet as clear as possible.

#### 526 *Each Definition and Each Note Prepared on a Separate Sheet*

Each class definition and each note thereto as well as each subclass definition and each note thereto should be prepared on a separate sheet of paper. These sheets are arranged in a looseleaf binder so that the class definition and class notes appended thereto appear first, with the subclass definitions and appended notes following in the numerical order of the subclass working numbers (see section 627 for meaning of working number). This is for ease of ready reference, by both the classifier and his supervisor. Another reason for placing each definition and each note on a separate sheet is to preclude the necessity of rewriting all such definitions and notes when only one needs revision.

## 527 *Cross-Referencing*

As stated in section 302, the disclosure in a patent whether claimed or not is that which anticipates and is of reference value to both the public and an Examiner. Therefore, it is of prime importance that the subject matter of each facet of a patent disclosure be provided for in that portion of the classification system designed for the particular facet. As further stated in section 303, the primary basis for assignment among classes of a particular patent is the most comprehensive claim of the patent. The assignment to a class (consonant with the factors discussed in detail in Chapter Three) and further subclass assignment within the class on the basis of schedule superiority (consonant with factors discussed in detail in Chapter Four) effects the placement of an "original" patent copy.

Disclosure in a patent, other than that encompassed by original assignment, is provided for by "cross-referencing," that is, placing an additional copy of the patent in each subclass pertinent to each additional facet of subject matter disclosed. For example, a patent disclosing novel subject matter provided for in three different classes with claims directed to but one of the subject matter would be assigned as an "original" to the class which provides for the claimed disclosure and a separate "cross-reference" copy would be assigned to each of the other two classes that provide for the other subject matter. Thus, even though the original classification assignment is determined by claimed disclosure, the additional cross-reference assignments made because of unclaimed disclosure would satisfy the requirements of all possible searches.

While an "original" patent copy is merely encoded with the appropriate class and subclass designation, all cross-reference patent copies are stamped "CROSS-REFERENCE." The significance of such differentiation is of some importance in the administration of the

U.S. Patent Classification System and the examination practices of the U.S. Patent Office.

Due to technological innovations, semantic factors and occasional personnel inadequacies, the title, definition, and notes of a given classification may, under some circumstances, fail to adequately describe the concepts included in a subclass. Only the original patents in such a classification—assigned thereto on the basis of claimed disclosure, applicable superiority guidelines and possible pertinent exceptions to general classification practice—are truly indicative of the concepts involved. As will be explained below, the cross-reference patent copies may reflect a great deal of subjective judgment on the part of a Classifier or Examiner and should not be accorded evidential value to construe the titles, definitions and notes. Thus for example, whether it be for the purpose of (a) resolving differences as to patent application or patent assignment (b) demonstrating separate classifications or divergent fields of search in an Examiner's requirement for restriction or (c) checking the validity of recent patent assignments, only patents assigned as originals may be cited. There is no difference at all with respect to the reference value of an original and cross-reference patent.

The pertinent cross-reference patents encountered by a searcher are a pointed reminder, sometimes not provided in the definition and notes of a given subclass, that loci other than the subclass containing the cross-reference copy provides for related subject matter and must be considered for a full search.

## 528 *Mandatory Cross-Referencing*

There are many situations in which a patent has several claims, which if separately found in different patents would be classifiable in dif-

ferent subclasses either in the same or in different classes. Classification of the original copy of such patent is based on the controlling subject matter among classes or on the basis of the first appearing among coordinate subclasses within a class in accordance with the applicable principles of superiority. It is obligatory in such situation to cross-reference the patent to the subclasses providing for the subject matter set forth in the other claims except where search notes are provided as set forth in section 534.

### 529 *Discretionary Cross-Referencing*

The question of what unclaimed subject matter should be cross-referenced and where is a vexing problem and to a large extent must be left to the good judgment of the Classifier or the Examiner expert in the art. Since there is a presumption that unclaimed subject matter is not new, it therefore would generally be of no value in a class or subclass providing for such subject matter. However, this is not necessarily true and much of this subject matter must be cross-referenced to make it available to a searcher conducting a search of such subject matter. There are no exact rules which can be given to determine what subject matter should be cross-referenced. However, when, in the judgment of the Classifier or Examiner, based on his knowledge and experience, the subject matter is novel and is disclosed in sufficient detail and clarity to be useful as a reference, it should be cross-referenced.

### 530 *Cross-Reference to Any Part of System*

One may not ignore subject matter because of lack of familiarity therewith. If a specific composition, electrical circuit, mechanical

movement, joint, support, etc., classifiable in a different class is disclosed, it should not be assumed that it is conventional because it is wholly unfamiliar subject matter. A Classifier or an Examiner having experience in the class involved should be consulted to determine if an optional cross-reference is needed, and if so what class and subclass is appropriate.

### 531 *Cross Referenced Subject Matter Must Fit Subclass Definition*

Subject matter should be cross-referenced to a subclass only if it fits the definition thereof, having in mind the position of the subclass in the schedule, but since the ultimate object is to aid the searcher a large amount of discretion may be used. As an example, see the schedule of class 172, Earth Working (Appendix I), subclasses 387 and 395. Due to its position subclass 395 excludes a runner as a type of ground support, yet since subclass 395 has indented under it a detailed breakdown on vertical adjustability, it is obvious that a novel disclosure of an adjustable runner would be a useful cross-reference in subclass 395+. In fact the term "ground support" rather than "wheel" was used to encourage cross-referencing from subclass 387 to subclass 395+.

On the other hand in some situations, cross-referencing should be used with great restraint. For example, in class 172, subclass 663+ is a generic group of subclasses directed to implements with actuators. Actuators for special purposes are found in many places in class 172; as an instance, subclass 452 relates to an implement provided with a specific type of actuator and has 54 indented subclasses, so it would be useless to ignore the position of subclass 663+ and overload it with actuator cross-references that are not mandatory from subclass 452+.

### 532 *Discretionary Cross-Referencing in Either Direction*

Discretionary cross-referencing may be done either from a higher to a lower or from a lower to a higher subclass, whenever appropriate. As a further explanation of this principle, let it be assumed that a patent claims only the combination of a pump and a pressure gauge but has a complete disclosure of a novel pump. A class of pumps has a subclass directed to the combination positioned above a subclass directed to the pump per se. The patent would be assigned to the subclass directed to the pump and gauge combination on the claimed disclosure and cross-referenced to the subclass directed to the pump. Conversely if the patent had claims directed solely to the pump, per se, and a good disclosure of what appeared to be a novel disclosure of pump and gauge, the patent would be assigned to the subclass directed to the pump and cross-referenced to the subclass directed to the pump and gauge combination.

### 533 *Techniques Used To Limit Cross-Referencing*

In creating a classification system, there are several techniques available to a Classifier to limit the amount of necessary cross-referencing. These consist of (1) properly positioning of subclasses in a schedule discussed in section 448 through 450 and (2) search notes.

### 534 *Search Notes Between Classes To Limit Cross-Referencing*

As set forth in section 527 a cross-reference should be assigned in a class other than that in which the patent is an original if appropriate. However, where there is a search note

in a class definition as set forth in section 520, referring to a second class the following procedure as to cross-referencing between such classes is generally followed. In situation (1) of section 520, the existence of a search note in the class definition of each of the related classes generally precludes the need for cross-referencing.

In situations (2) and (3) of section 520, however where a combination-subcombination relationship exists, the mere presence of a search note in the class definition does not preclude the need for cross-referencing particular disclosures when a specific subclass therefor is provided in a class other than that in which a patent is assigned as an original.

### 535 *Search Notes Between Subclasses To Limit Cross-Referencing*

As stated in section 521, search notes may be used between subclasses to limit cross-referencing. Such notes, when used, are intended to preclude both mandatory and discretionary cross-referencing. The following are the general considerations governing the choice between cross-referencing and search notes:

(1) Where two subclasses either in the same or separate classes contain subjects matter related in structure or mode of operation but which are separated on a different functional basis, a search note is provided in each subclass referring to the other subclass and no patents are cross-referenced from either subclass to the other.

(2) Where two coordinate subclasses have a combination-subcombination relationship and the subcombination subclass title consists of the identical terminology of a portion of the combination subclass title or a subclass indented thereunder a search note is provided in the subcombination sub-

class only indicating that the combination subclass or the subclass indented thereunder must be searched when conducting a search for the subcombination. No cross-references are made from the combination subclass or subclass indented thereunder to the subcombination. However, a combination disclosure in a patent assigned to the subcombination subclass may be cross-referenced if it is believed to be novel and is disclosed in sufficient detail to be useful as a reference.

(3) Where two coordinate subclasses have a genus-species relationship the species subclass appearing first in the schedule, a note referring to the species subclass is provided in the genus subclass. No cross-reference of such species are made to the genus subclass. However, a claimed disclosure to a different species must be cross-referenced to the genus subclass (or to a subclass providing for such species indented thereunder) and an unclaimed disclosure to such different species may be cross-referenced to the genus subclass (or to a subclass providing for such species indented thereunder) if it is believed to be useful as a reference.

(4) Where there are two subclasses the first of which contains a voluminous amount of patents having disclosures directed to subject matter which could be cross-referenced to the second subclass but which fact is not evident from the titles of the subclasses, a search note is provided in the definition of the second subclass indicating that the first subclass must be searched and no patents are cross-referenced from the first subclass to the second subclass.

In each of the above situations it is proper to include one or two cross-references irrespective of the presence of a search note, to alert a

searcher who may have overlooked the search note for a pertinent field of search.

### 536 *Search Notes Between Coordinate Subclasses of the Same Class*

The principles relating to search notes and cross-referencing in situations (2) and (3) of the previous section only apply when the subcombination-combination and species-genus subclasses are coordinate or in different coordinate groups. These principles do not apply when these subclasses are so arranged that the combination and species subclasses are indented under the subcombination and genus subclasses respectively for the reason given in the following section.

### 537 *Cross-Referencing and Search Notes Between a Parent Subclass and Its Indents*

The two most frequent types of relationship between a parent subclass and subclasses indented thereunder are (1) combination-subcombination and (2) genus-species.

In the type involving the combination-subcombination relationship—that is, where the indented subclass is directed to a combination, which includes the subject matter of the parent subclass as a subcombination thereof—the general principle is that there should be no search notes or cross-referencing therebetween (section 308).

In the type involving the genus-species relationship, that is, where the parent subclass is directed to a genus and the indented subclass is directed to a species thereof, the general principle is that there should be no search notes therebetween, but cross-referencing may be made either from the genus subclass to an indented subclass or from an indented subclass to the genus subclass (section 309).

**538 *Search Note in a Subclass Does Not Preclude Cross-Referencing in an Indent Thereof***

A note in a first subclass indicating that a second subclass should be searched in connection with a search for the subject matter of such first subclass, does not preclude cross-referencing of a patent from such second subclass to a subclass indented under such first subclass and directed to a specific variant thereof.

**539 *Summary of Principles Relating to Definition, Notes and Cross-Referencing***

**EACH CLASS AND SUBCLASS MUST BE DEFINED**

In the U.S. Patent Classification System each class and subclass must be defined, that is the title of each class or subclass must be explained in a detailed statement setting forth the metes and bounds of the area of subject matter for each class and subclass. A class and subclass definition must include a description of the subject matter encompassed by the class or subclass and may include any necessary explanatory and search notes.

**TENTATIVE DEFINITION**

The Classifier must write a tentative or preliminary definition of a class to be created as soon as possible after determining the initial scope of such class. This tentative definition should be modified, if necessary, as the project progresses and as more subject matter is considered. This same principle applies to a subclass definition, that is, a tentative definition is written as soon as possible after a subclass is

created and should be modified, if necessary, as more subject matter is considered.

**EXPLANATORY NOTES FOR CLASS OR SUBCLASS DEFINITION**

In many instances, explanatory notes relating to excluded subject matter, the explanation of some term or expression used in the definition, statements intended to further clarify the definition, etc., may be appended either to a class or subclass definition.

**SEARCH NOTES FOR CLASS OR SUBCLASS DEFINITION**

To supplement or take the place of cross-referencing, search notes are needed, giving directions and suggestions for further search and setting out the relationship and lines of distinction between classes and subclasses. Search notes should indicate other classes or subclasses directed to analogous or related subject matter. Search notes should also indicate classes or subclasses directed to subject matter constituting either a combination or subcombination of the class or subclass in which the note is written. When writing a search note indicating a class directed to a subcombination which is common to subject matter of several classes it should be so indicated. The Index to Classification is a useful guide in locating such subject matter.

**CROSS-REFERENCING**

Nearly every patent discloses subject matter that is classifiable in a different class or subclass than that which provides for the subject matter of the controlling claim. In the U.S. Patent Classification System such different subject matter is appropriately provided for by the assignment of one or more cross-reference copies. Such subject matter falls into two categories, (1) subject matter which is sepa-

rately claimed, per se, in a claim other than the controlling claim, and (2) subject matter which is disclosed but not claimed, per se, in a claim other than the controlling claim.

#### CROSS-REFERENCING CLAIMED DISCLOSURE

Where a patent has several claims and the patent is assigned as an original copy on the basis of one of the claims, it is obligatory to cross-reference the patent to the subclass or subclasses providing for disparate subject matter of the other claims, if any, unless search notes are provided which would lead a searcher to the subclass to which the patent is assigned as an original.

#### CROSS-REFERENCING UNCLAIMED DISCLOSURE

Any disclosure in a patent which is disclosed but not claimed, per se, may be cross-referenced in to any part of the classification system at the discretion of the Classifier. The following criteria, should be considered for such cross-referencing: (1) the disclosure must, in the best judgment of the Classifier, be novel and (2) the disclosure must be of sufficient detail and clarity to be useful as a reference. No cross-reference is made when a search note is appended to the definition of the subclass eligible to receive the cross-reference, indicating that the subclass containing the original copy of the patent must be searched.



## *Classification Project: Practice and Procedure*

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## 600 *Introduction*

The preceding chapters have dealt with principles applied in organizing scientific and technical subject matter into a unified classification system suitable to the needs of the patent profession.

This chapter deals with the practice and procedure to be followed in carrying out a classification project. The presentation of the subject matter in this chapter involves the various aspects of such practice and procedure in sequence and separately. However all of these aspects must be continuously kept in mind during the development of the project and must not be applied in the order or sequence presented here, first, because the sequence given is not necessarily that in which they must be considered, and second, many aspects which of necessity must be treated separately may have to be simultaneously applied.

## 601 *Types of Projects*

The U.S. Patent Classification System has, of course, been in existence for many years. During this time the documents representing the useful arts have been organized into a classification system consisting of more than 300 classes. Therefore, the task—in a practical framework—faced by the Office of Patent Classification is not of gathering a mass of completely disassociated subject matter and organizing such subject matter into a classification system; it is rather one of reworking portions of the existing system in accordance with a still evolving methodology, parts of which were adopted subsequent to the time the system was originally established. Such reworking generally results in projects of the following types:

- (1) Establishing a new class or system from the subject matter of one or more existing classes or subclasses, which existing

classes or subclasses are then simultaneously abolished. For example, the subject matter of three classes were brought together into one class in the creation of the class of Fire Escapes, Ladders and Scaffolds.

- (2) An existing class may be abolished and the subject matter thereof woven into another existing class, sometimes with the creation of new subclasses. Such technique was used in abolishing the old class of Fluid Pressure Regulators and the old class of Multiple Valves. This subject matter, for the most part, is now in the class of Fluid Handling.

- (3) Collecting AB and Ap combinations scattered through an existing class.

- (4) Subdividing oversize subclasses of an existing class.

- (5) Collecting subject matter essentially the same but at present scattered in two or more classes.

In selecting a classification project, factors that must be considered include the condition (e.g. number of patents, integrity, age etc.) of the particular segment of the system under consideration, the search activity for the subject matter included in such segment, and the availability of qualified personnel and time that may be devoted to the project.

## 602 *Preliminary Determination of Project Scope*

Having decided upon a particular project, one of the first tasks of the Classifier is to make a preliminary determination of the scope of the project. Relative to such determination three facets must be distinguished, namely:

- (1) Basic subject matter.
- (2) Scope of class.
- (3) Scope of project.

The basic subject matter of a class, as discussed in Chapter Three, is a segment of the

total mass of scientific and technical subject matter, separated on the basis of a proximate function, effect or product, so as to form a nucleus of subject matter unique to that class.

The scope of a class is the total subject matter included within the class. It comprises the basic subject matter A, all Ap and AB combinations included in the class and all subcombination elements X, of the basic subject matter retained in the class.

The scope of a project may be the same as the scope of a class or any portion thereof, that is, a project may encompass only a revision of the AB and Ap combinations in the class or a revision of the subject matter pertaining to subcombination elements X. The scope of a project is, generally, flexible from the time it is selected up to and until it is completed. The scope of a project may also, and usually does, include consideration and modification of related subject matter in other classes.

### 603 *Factors To Be Determined in Defining Project Scope*

A Classifier considering the initial scope of a project should attempt to define broadly some or all of the following: 1) the area of scientific and technical subject matter to be included in the project, 2) the basic subject matter of the area to be reclassified, 3) the categories of subject matter (e.g. process product, apparatus and material) included in the subject matter of the project and 4) the distribution of other subject matter related to the project subject matter, with particular emphasis on the following aspects:

- (a) Conflicts which exist.
- (b) Variant species.
- (c) Combinations of which the project subject matter is a subcombination.
- (d) Subcombinations specialized to project subject matter.

(e) Subcombinations not specialized to project subject matter.

(f) Presently stated lines between project subject matter and related subject matter.

The Classifier responsible for selecting a project also has the responsibility of determining the initial scope thereof. In making such initial determination, the Classifier usually consults with other members of the Office of Patent Classification having pertinent knowledge of the particular segment of subject matter involved. This initial determination is rarely exact, and more detailed information collected and evaluated as the project progresses usually necessitates modification of the project scope.

### 604 *Defining Preliminary Scope*

The scope of the project as initially determined must be reduced to writing and amended as more information is received and further decisions are reached. The writing must not be postponed. Failure to fully comply with this requirement frequently results in subsequent omission of highly pertinent information. At the time that a Classifier accumulates information which is seemingly clear in his mind, the Classifier may think that he will never forget it. Later events all too often crowd out important items of information from his mind, which if written down cannot be forgotten. This information, as developed into final form, is eventually used in drafting the definition for the project.

### 605 *Classifier Responsible for Recommending Changes in Project Scope*

As information is collected, it is necessary to make determinations as to whether the project should be enlarged in scope to include addi-

tional subject matter, should be decreased in scope to exclude certain types of subject matter therefrom or should be retained in substantially the scope originally determined.

Only those fully conversant with all of the pertinent information and documents that either directly or indirectly impinge upon any developing classification system can accurately determine appropriate changes in project scope. It is apparent that the immediate supervisor of a Classifier can inspect but a few of the total number of patents involved in the subject matter of the area to be classified. Thus the Classifier must develop all pertinent evidence, evaluate it, determine whether the classification project should be broadened or narrowed in scope, whether it should take in more subject matter than was originally determined or less, then present to his supervisor exemplary evidence and reasons for recommending changes, and finally gather together and classify the subject matter commensurate with the final scope determined.

#### 606 *Effect of Change in Project Scope on Other Portions of Project*

Every time the scope of a project is changed, the effect of such change on all subclasses in the project must be considered. The title, definition and notes of such subclasses must be immediately amended if necessitated by such change. If such effect is not considered each time a change is made, the need for such consideration may be forgotten and the necessary amendments never made. Further, immediate consideration of such effects may lead to a conclusion that the proposed change is erroneous and should not be made because it would lead to too many deleterious results. Alternatively, it may be found that the proposed change is advantageous and suggests similar advantageous changes elsewhere.

#### 607 *Effect of Project on Titles, Definitions, and Notes of Classes and Subclasses Not Included in Project*

Substantially every classification project affects the titles, definitions and notes in one or more classes other than the project. Even in the case of the partial revision of a project class, the titles, definitions and notes of a class or subclass other than those involved in the project may be affected. A Classifier must constantly be aware of such effects and must make all necessary changes in such titles, definitions and notes of the affected classes whenever such changes are needed.

Situations in a project in which titles, definitions and notes of one or more classes or subclasses other than those in the new class or classes are affected include the following:

- (1) Where new subclasses are made in existing classes as well as in the new class.
- (2) Where all subclasses which comprise the source of patents for the project are abolished.
- (3) Where patents (i.e., subject matter) are transferred to existing subclasses.
- (4) Where patents (i.e., subject matter) have been transferred from existing subclasses which are not abolished.
- (5) Where notes to an abolished subclass or a subclass which has been changed in scope or character exist.
- (6) Where a new field of search is established by creation of new subclasses to subject matter related to subject matter in an existing class or subclass. In this situation, notes must be placed in the existing class or subclass to the newly created subclasses.

#### 608 *Collection and Treatment of Information*

Every classification project involves collecting all pertinent information and the assimilation thereof both to initiate any necessary

changes in project scope and to develop schedules. The major chore, of course, is the collection of patent disclosures pertinent to the project and the analysis and synthesis of the subject matter thereof into new subclasses or the assignment of such patents into existing subclasses. A great deal of informational material other than patent disclosures must be investigated to guide the Classifier to all loci of pertinent subject matter that need collecting, assist in clarifying the scope of the project and possible useful modes of subdivision.

Succeeding sections 609–616, inclusive, present the various sources of information available which must be investigated.

### 609 *Existing Definitions and Notes*

Practically every project, whether a newly created major classification or mere subdivision of oversize subclasses, utilizes patents obtained from defined subclasses. The definitions thereof and the definitions of the class of which they are a part must be carefully reviewed to extract therefrom all useful information bearing on the project.

Classes have internal search notes, that is, notes appended to the definition of a subclass referring to other subclasses within the class. These must all be inspected to uncover all references to a subclass being reclassified.

All classes also have external search notes, that is, notes referring to other classes. All such notes in any class referring to a class or subclass being reclassified must be reviewed.

The Service Branch of the Office of Patent Classification maintains an "Index of Notes in Classes." This index has a separate card or set of cards for each class. Listed under each class number are all other classes which contain a note to the class under which they are listed.

The index indicates whether a note occurs in the class definition or in a subclass definition

giving the subclass number. Utilizing this index, the Service Branch can provide the Classifier with a list of all classes and subclasses in the U.S. Patent Classification System which contain external search note references to any class or subclass being reclassified. There is no corresponding index to internal search notes. To obtain these, the Classifier must scrutinize the notes of the class in which he is interested.

### 610 *Classification Decisions Relative to Patent Application Assignment*

Written decisions by Classifiers relative to the assignment of a patent application frequently recite useful information. They may set forth distinctions between classes that have been established in the past as shown by the distribution of subject matter but never incorporated in the definitions. They may show that there are plural groups of patents for similar subject matter located in different places among which no tenable distinction exists. In this latter case, it usually is necessary to collect patents to subject matter of the project from a plurality of classes. These written decisions may well be the best available means of determining the location of such subject matter.

The Service Branch of the Office of Patent Classification maintains a card index to all such written decisions indicated, at the time rendered, as worthy of preservation. All decisions involve at least two classes and may involve three or more. This index lists every such decision including each class involved and giving the volume and page of the decision books in which a copy of the decision has been placed. Thus, relative to any classification project, all recorded pertinent classification decisions may be readily found by using this card index. For a discussion of the method used in indexing a classification decision, see section 802.

## 611 *Examining Groups*

All information pertinent to a classification project that is available in an Examining Group, must be obtained. The Group Manager of the Examining Group involved and subordinate examining unit heads should be consulted for any pertinent information they may have and so that they will be informed that a classification project is contemplated, to permit advance planning of any administrative action which might be necessitated by the movement of an area of subject matter into or out of the Group as a result of the project.

## 612 *Patent Examiners*

For the most part, a Patent Examiner actually processing applications pertaining to subject matter considered for reclassification is the best source of information about that subject matter. He should be consulted for all suggestions that he may have. He will frequently refer the Classifier to other Examiners having knowledge of the subject matter or related subject matter. A few suggested questions that may be asked of the Examiner are listed below:

- (1) What conflicts exist?
- (2) What suggestions does he have for resolving them?
- (3) Where are combinations of which the subject matter under discussion is a part?
- (4) Where are subcombinations of the subject matter?
- (5) What subclasses would he suggest being made?
- (6) What type of subject matter is most difficult to find when conducting a search therefor?
- (7) Where are other species of the subject matter?

(8) What are the trends in the particular area of subject matter as indicated by applications and publications?

Such broad questions must, of course, be translated into specific questions couched in terms of the particular subject matter.

## 613 *Unofficial Subclasses and Digests*

The Classifier must collect all available recorded Patent Office information relating to unofficial collections of subject matter such as unofficial subclasses or digests. If such subclasses or digests are undefined (as most are) a statement from the Patent Examiner handling the same, setting forth the subject matter intended to be included in each unofficial subclass or digest, may provide substantially the same kind of information as definitions. Also, he may help the Classifier evaluate such collections.

## 614 *Other Classification Systems and Books*

Suggestions for subject matter groupings may be obtained by inspecting other classification systems and the indices of books on the subject.

Where classification systems have been made by industry covering the subject matter of the project, it may, if possible be worthwhile to obtain and inspect them. It may also be useful to inspect the classification systems developed by foreign patent offices.

Significant assistance can often be obtained from other portions of the U.S. Patent Classification System. The Classifier should inspect classes that contain analogous subject matter and consider the mode of treatment for such subject matter. For example, in a reclassification project involving the old class of

Metal Founding, reference was made to the class of Plastic and Non-Metallic Article Shaping Or Treating: Processes. Information was sought as to possible types of, or arrangement, of subclasses which could be made in reclassifying the subject matter in the Metal Founding class. The subject matter of these two areas of the classification system is quite similar and in many instances the subdivisions in the class of Plastics and Non-Metallic Article Shaping Or Treating: Processes were used to develop subdivisions for the subject matter in the class of Metal Founding.

#### 615 *Cross-References Within the Scope of the Project Which Are Originals in Other Classes*

The cross-references within the scope of the project which are originals in other classes—that is, external to the project—must be considered by a Classifier and information noted as to the present distribution of the subject matter disclosed therein. These cross-references show where combinations, subcombinations, variant species, manufacturing processes, compositions, etc., are classified. They often also show where directly conflicting subject matter is to be found. While inspecting such cross-references, notes must be kept as to the relationships and differences between subject matter elsewhere classified and the subject matter undergoing reclassification.

#### 616 *Original U.S. Patents Within the Scope of the Project*

Finally, substantially all of the information pertinent to the subject matter of any classification project will be derived from the original U.S. patents within the scope of the project. It is from the analysis of these patents, in ac-

cordance with the principles set forth in Chapter Three, that the significant information for creating the new system will be derived.

#### 617 *Efforts Confined to Project Assigned*

While evaluating the above listed information, two situations will be encountered which continually have to be resolved, namely:

(1) Situations directly connected with the assigned project, which must be treated in connection therewith in order to reach accurate decisions as to the final scope of, and to properly complete the project.

(2) Collateral, related problems, unnecessary to properly complete the assigned project.

It is frequently difficult to determine whether situations encountered fall under (1) or (2). Wherever the situation is clearly (2) the classifier must resist the temptation (which at times can be very strong) of spending the time necessary to resolve the problem. Information relating to such collateral problems, however, must be recorded to form a basis for search notes in the class or subclass definitions. Such information can also be used in recommending a separate project intended to resolve these problems.

#### 618 *Service Branch Obtains and Arranges Patent Copies*

The assigned project will usually include a specified class, or number of subclasses, which will determine the initial U.S. patents to be obtained and analyzed. The Classifier notifies the clerk of his division who submits a written request for the patents in such class or number of subclasses to the Classification Service Branch.

The Classification Service Branch obtains copies of all patents requested. When the copies are turned over to the Classifier, the originals are encoded, giving the existing assignment by class and subclass. The cross-references which are assigned as originals in other classes are marked to indicate the original assignment thereof.

The Classification Service Branch will also separate and retain the cross-reference copies which are assigned as originals to the subclasses of the project. There is no need to see these copies, because the Classifier will see and analyze the original copy of these patents.

### 619 *Obtaining Additional Pertinent Subject Matter*

As a result of the information obtained from investigating the sources, sections 609–616, and the analysis of the patents included in the classes or subclasses originally assigned to the project, it may become apparent that patents to additional subject matter assigned to other classes and subclasses must necessarily be included in the project.

Once it is determined that such additional patents are needed, search must be made therefor in any class or subclass suggested by the Manual of Classification or the alphabetical index thereto. The Classifier's efforts in finding such additional subject matter should be directed only to the classes considered to be reasonably productive of pertinent patents. This means that it is considered wasted effort to search a large class, subclass by subclass, where only one or two pertinent patents might be found. Frequently, such isolated patents can be more readily found by recourse to the Examiner who examines patent applications directed to the subject matter of that class. However, when the Classifier has reason to believe that a class or a portion thereof has a con-

siderable number of pertinent patents, he must search it himself because only the Classifier has fixed definite ideas of what subject matter is needed for the project.

As a result of such search, the Classifier may find subject matter, which, even though not classifiable into the project class, may furnish additional information as to still other pertinent classes. These classes, for example, may include patents directed to excluded combinations, subcombinations, variant species of the subject matter under classification, etc.

### 620 *Analysis of Original U.S. Patents and Creation of a Schedule*

The disclosures of the original U.S. patents furnished by the Classification Service Branch are analyzed as set forth in Chapter Three. It is on the basis of this analysis that schedules of new subclasses are developed in accordance with the principles set forth in Chapter Four and the final disposition of the project is determined. As stated in section 616, substantially all the information pertinent to any phase of a classification project is derived from U.S. patents. Information derived from the other sources may assist in determining the scope of the project and to some extent assist in the creation of certain types of desirable subclasses. However, subdivision of the bulk of the subject matter, along the lines that will establish the most pertinent search fields for the subject matter involved in the project, can only be done after acquiring and absorbing thorough knowledge of the actual subject matter to be subdivided. This, past experience has demonstrated, can be done only by a proper analysis of the pertinent documents used in creating the system which, for the purpose of the U.S. Patent Classification System, are the U.S. patents.

## 621 *Techniques for Conducting Systematic Analysis*

The following represents a method or procedure used to conduct the analysis of the patents in such manner as to effectively create the subclasses and arrange such subclasses in a proper schedule.

(1) The initial analysis may consist of a sampling of the subject matter by the Classifier by selecting at random and analyzing a number of patents from the various subclasses of the portion of the system being classified, preferably including the miscellaneous subclass and all first-line subclasses in the old or existing class or classes within the scope of the project. The patents selected should emphasize the newer patents but should also include some older patents to provide a broad survey of the subject matter and its problems. From this sampling, recurring AB and Ap combinations and other special type subject matter must be isolated and first-line subclasses created therefor (e.g., convertible, automatic control etc.). Further from this sampling, various types of basic subject matter and subcombinations thereof should be recognized and first-line subclasses created therefor. These various types of subclasses—AB, Ap, convertible, automatic control, basic subject matter and combinations thereof—can be positioned relative to each other in a schedule in accordance with the general arrangement of subclasses set forth in section 442.

In relatively small projects it may be more expedient to analyze all the patents rather than a mere random sampling in the creation of the schedule.

(2) During the analysis, notes relating to the claimed disclosure may be written in erasable pencil on the patent copy and patents having like claimed features are physi-

cally grouped together for a later study to determine whether such groups may form the basis of subclasses. When a sufficient number of patents has been analysed and as a result a number of study groups formed, the groups are studied to determine whether or not each can form the basis of a subclass. If a subclass is created a title and tentative definition are written therefor, a number is assigned thereto and it is given a tentative position in a beginning schedule. As more groups are studied and found to form the basis of subclasses they are in turn properly positioned in the schedule.

(3) An alternative technique for creating subclasses for a beginning schedule comprises the use of analysis sheets. This technique should be used only when complex subject matter (e.g. subject matter typified by the class of Electricity Motive Power Systems or the class of Modulated Carrier Wave Communication Systems etc.) is being classified, or in other instances of special circumstances which makes use thereof economically feasible. The analysis sheets should include the number of the patent analysed and a synopsis of the claimed disclosure. Should the subject matter be such that the claimed disclosures are directed to two or more categories of subject matter, then the analysis sheets should also include the category of subject matter to which the claimed disclosures are directed.

After analysing a selected number of patents, the Classifier by studying the various sheets can arrive at a decision as to which of the listed patents contain subject matter for either AB or Ap combinations and which patents contain subject matter constituting basic subject matter and which are directed to subcombinations thereof. The patents forming the basis of each may then be assembled together into separate subclasses and the subclasses arranged in accordance

with the principles set forth in Section 442 to form an initial or starting schedule.

(4) Having established a skeleton schedule (including AB and Ap subclasses and possibly other special type subclasses, subclasses for various types of basic subject matter and subclasses for subcombinations thereof) effort should be concentrated on subdividing identified areas of basic subject matter to further create subclasses therefor. Many areas of the old or existing classes or subclasses included within the project scope can usually be delineated as being directed to a particular portion of the new skeleton schedule.

(5) While creating subclasses in a particular area of subject matter, there must be a constant alert for subject matter which could form the basis of other AB or Ap subclasses or other special type subclasses. Also every effort should be made to recognize any new basic subject matter concepts or subcombination concepts which can then be recognized by establishing additional first line subclasses.

(6) Having established a schedule by following the procedure set forth above, there remain many patents which have not been investigated. These patents are at this time analyzed and assigned to appropriate subclasses in the schedule. Again there must be a constant alert for subject matter which may form the basis of additional subclasses.

(7) In assigning patents to a newly created subclass, care must be taken not to assign patents claiming a larger combination than that provided for in that subclass. Such patents either should be immediately considered as a basis for a new subclass, or set aside to be considered at a future date on the possibility that more patents directed to such subject matter will be found. Failure to follow this procedure usually results in some important concepts being overlooked.

(8) The tentative subclasses created should be based on as specific a concept as possible. If this is done, and the subclasses continuously maintained in proper arrangement, the collection of a large number of patents in a subclass based on a broad concept requiring further subdivision will be avoided. Upon determining that a number of specific subclasses can be grouped under a common genus, as discussed in section 408, the genus subclass is established and all the species subclasses are then indented under such genus subclasses. If no patents remain for the genus subclass, the procedure is to abolish one of the species subclasses—usually the one which is positioned lowest in the schedule relative to the other species subclasses—and place the patents taken therefrom in the genus subclass.

## 622 *Subject Matter of General Utility for Which no Other Class Provides*

Frequently some patents in the area of subject matter included in the project are directed to subject matter of general utility; for example, a subcombination not specialized to the basic subject matter of the project class, and no other class is organized to take such subject matter. The procedure in such a situation is to establish a subclass or subclasses for such subject matter and place such subclass or subclasses in a prominent position in the schedule, so as to make such subject matter readily available when and if a class designed to take it is later developed.

## 623 *Disposition of Transfers In*

As stated in section 619 it sometimes becomes necessary to acquire additional patents to subject matter not originally assigned to the project. These patents are designated as

“transfers in.” The addition of such subject matter may cause certain newly created subclasses to become oversize, that is, one to which an unusually large number of patents have been assigned, or may constitute subject matter not specifically provided for. This necessitates the creation of additional subclasses by subdividing such oversize subclasses or by creating additional subclasses for the subject matter not provided for.

## 624 *Disposition of Transfers Out*

Usually some patents in the area of subject matter included in the project are found to be directed to subject matter classified in some other classes. The information collected from all sources available to the Classifier should be such as to lead to accurate conclusions as to such patents and the classes able to receive the same. These patents must be transferred to such other classes and are designated as “transfers out.”

Transfers out fall into several general categories:

(1) Those few miscellaneous patents which clearly, under any possible modification of scope of the project, will be transferred to existing subclasses in some other class. For example, in a classification project dealing with the separation of gas from liquids or solids classifiable in the class of Gas Separation, a patent disclosing no gas separation, and dealing with apparel classifiable in the class of Apparel is transferred immediately to the class of Apparel.

(2) Originals that will be transferred to other classes, but may or many not require new subclasses to be formed. These are accumulated under appropriate titles in tentative subclasses. After they are accumulated, a determination as to whether they should be transferred to existing subclasses

or new subclasses created therefor, can better be made at that time.

(3) Originals on subject matter that may or may not be transferred to other classes (e.g., combinations AB or subcombination X of general utility) are accumulated in tentative subclasses under appropriate titles with definitions and notes to more readily and thoroughly study the propriety of transfer

For example, in a project dealing primarily with the structure of vacuum tubes, patents are found which may be separately grouped in the following manner, representative of the several categories of subject matter.

- (a) Electrical circuits using vacuum tubes.
- (b) Vacuum tube organizations.
- (c) Processes of making vacuum tubes.
- (d) Apparatus for making vacuum tubes.
- (e) Compositions used in vacuum tubes.

Such an arrangement will facilitate the study of whether patents to such subject matter should be retained in the project or transferred to appropriate electrical system, manufacturing or composition classes.

## 625 *Making Subclasses in Other Classes*

Wherever patents are transferred to other classes, the question arises as to whether or not new subclasses should be created. New subclasses may be created to keep subject matter, that should form a unitary search field, from either (1) being scattered through numerous subclasses or (2) from being lost in an oversize subclass, that is, one to which an unusually large number of patents have been assigned containing numerous distinct subjects matter. Where situation (1) exists, it is usually treated as directly connected with the

project and needed subclasses are created, but where situation (2) exists, it may or may not be treated as directly connected with the project depending on available time, manpower and the status of said other class.

### 626 *Techniques for Assigning Transfers Out*

The patents which are transferred to existing subclasses in other classes must be analysed and marked with the proper class and subclass number. The question then arises as to whether the Classifier on the project or the Classifiers who administer the various classes to which these patents are assignable should analyze these patents and assign them to the proper class and subclass. The answer is simple—the technique which would be more expeditious, and which would best serve the entire classification system should be used.

For example, in a project involving mechanical subject matter assume that a body of subject matter of a chemical nature, classifiable in a chemical class, is found. In such a situation, it may be difficult and time consuming for the Classifier in the mechanical area to analyse, and assign the patents in the proper chemical class and subclass. It should be a simple task for a Classifier in the proper chemical area to perform the same operation. Therefore, in this type of situation it is more expeditious to have the Classifier in the chemical area analyse and assign the patents.

Another technique has been effectively used, particularly where the subject matter of the project class and the class to which the patents are to be assigned are similar; for example, both are machine tool classes. This technique involves selecting exemplary patents, representing the various types that are to be transferred, then analysing these patents and presenting them with all the pertinent facts to the Classifier who administers the class to which

the patents are believed assignable, so that an agreement may be reached on the basis of assignability of such patents. If such an agreement is reached, the Classifier for the project class can then assign the remaining patents in accordance with the agreement.

### 627 *Assignment of a Working Number to Each Tentative Subclass*

As each proposed or tentative subclass is formed by placing claimed disclosures therein and is given a title, a temporary identifying subclass number should be placed adjacent the title.

This temporary number is called a “working” number, and should not correspond to the final or official subclass number for the classification schedule as finally adopted and issued, due to (1) the necessity for shifting proposed subclasses within the schedule to obtain proper superiority, and (2) the fact that the subclasses to be retained and made official are not known until the project is completed. This working number is written on each patent copy placed in the proposed subclass.

Generally a working number should not be assigned to a tentative subclass until all the following conditions are satisfied:

- (1) A copy of a patent with a claimed disclosure directed to the subject matter of such subclass is found.
- (2) A tentative title has been written.
- (3) A tentative subclass definition has been written.

### 628 *Retention of Working Number Once Assigned*

Once a working number is assigned to a subclass, that number is never to be changed or abolished unless, (1) the subclass is abolished as set forth in section 629 and the patents

therein assigned to other subclasses or (2) the scope of the subclass is reduced by removing some subject matter therefrom and assigning the same to some other subclass. In both situations the number is abolished and not reused again. In situation (2), the dropping of the working number may not be necessary at an early stage of a classification project particularly if no cross-references have been assigned to such subclass.

As the relative positions of subclasses are shifted to obtain proper positional superiority during the creation of a schedule, there may be a strong impulse to change the numbers to maintain the subclasses in numerical sequence. This must not be done since the working numbers are also applied to each patent copy being classified and to the definitions and notes, thus any change in the working number of a subclass would necessitate changing this number wherever it has been used.

### 629 *Working Numbers Used in Numerical Sequence*

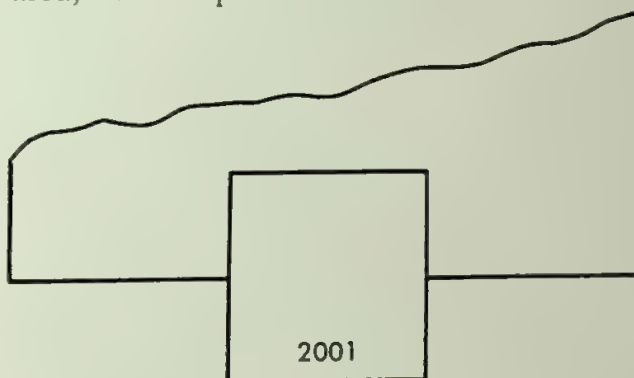
Working numbers are usually of four digits and should be used in numerical sequence. For example, the first proposed subclass could be 2000, the second numbered 2001, the third 2002, etc.

A single number is used for a single subclass only. It must not be used for a second subclass, since this will result in confusion as to both placement of originals and cross-references in the final schedule. Further, where a proposed subclass is subsequently found to be unworkable, it must be abolished along with its working number, which number is not thereafter used again in that project.

To prevent the use of a working number once it has been abolished, a working number control sheet should be used. This sheet, Form PO-642, consists of 100 spaces in which working numbers may be written. As the

working numbers are used to designate a newly created subclass, they are written in numerical order in successive spaces on the control sheet. Once a number is abolished, it is crossed off on the sheet. In this manner, it is easy to ascertain which numbers of a given block of numbers have been used, which have been abolished and which are still in use simply by looking at the control sheet.

To identify the groups of subject matter forming proposed subclasses in the storage cases and to readily keep track of the working numbers available for use, a set of stiff separator sheets, having secured thereto tabs marked with a series of working numbers are used, for example.



By this means, each proposed subclass can be kept in numerical working number order in the storage cases, readily available for inspection.

When a number is used, a separator sheet having such number on its tab is taken from the supply, the patent copies for such proposed subclass are placed on the separator sheet and the sheet with the copies is placed in the storage case. These separator sheets and patent copies must be filed in the storage case in numerical order of the working numbers on the tabs, and not in the order of the subclasses as they appear in the schedule.

When any proposed subclass is found to be unworkable and is abolished, the separator sheet therefor should be placed in a special storage space reserved for separator sheets having numbers of abolished subclasses and

not used thereafter. A line is drawn through the number on the tab of each of these separator sheets to insure that these sheets will not be used again.

### 630 *Working Number Not Assigned to a Subclass Containing No Patents*

Many of the lines of subdivisions are conceived prior to the time that a patent directed to subject matter classifiable in such subclass is found. However, a number is given to a proposed subclass only if at least one patent copy is in fact placed therein.

Also, where the analysis and creation of subclasses is on a specific basis, as set forth in section 621, there may be no patents for broad concepts under which more specific concepts are indented until substantially the end of the project. In such situations no working number should be assigned to the broad concept until a patent is found therefor. For example, a class may have the following arrangement of subclasses:

ROLL TYPE	
	Framed
2400	Adjustable size frame

The lack of a working number for the first two subclasses indicates that no patents have been found for these subclasses. Upon finding patents for these subclasses, they are then assigned a working number.

### 631 *Marking Patent Copies With Working Numbers*

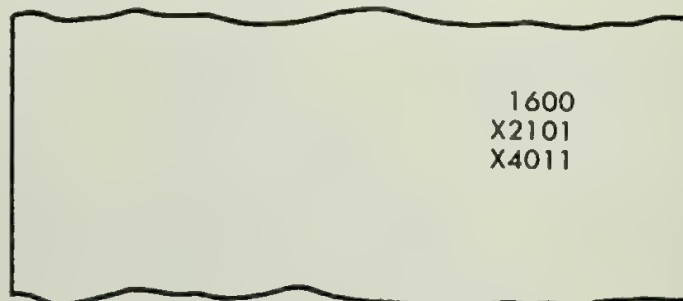
Throughout any classification project it is necessary to mark the patent copies from which the schedule is developed with the appropriate working numbers. If this is uniformly done, accuracy and completeness in various phases of the work is enhanced. The clerical staff of the Classification Service Branch is unac-

quainted with the subject matter being reclassified. The numbers placed on the documents to be classified, relating to the original classification or cross-referencing thereof, are thus the only instructions followed by the clerical staff in performing their assigned task. Therefore, it is important that these numbers be clearly and legibly written in a uniform manner and in the same area to insure accurate handling by this staff.

The same system of numbering patent copies from existing classes and subclasses is used for all miscellaneous documents that are classified or cross-referenced, including foreign patents and non-patent literature, with the following exception: foreign patents, publications and unofficial cross-references from an examiner's digest may, if not marked until then, be marked with final subclass numbers after the final numbers have been assigned to the newly created subclasses as set forth in section 639. Final numbers are to be used on these documents only after notification of a change from working to final numbers has been given the Service Branch.

### 632 *Position and Type of Markings*

The following sets forth the standard operating procedure for placing working numbers on patent copies. The working numbers used by a Classifier should contain four digits and should be uniformly placed in the same general areas of each patent copy. The right margin of the top sheet of each copy is the preferable location.



A different series of working numbers should be selected for each project. All old working numbers appearing on documents must be canceled or erased. Among preliminary study groups, letter designations in the lower left hand corner are suggested.

### 633 *Uniform System of Marking*

The following markings should always be used to designate the action to be taken by the Service Branch with regards to the patent copy:

<i>Marking</i>	<i>Meaning</i>
(1) 1600	A working number without any other designation signifies the original classification and always appears first, if used. It indicates that the original copy of the patent on which it appears is to be transferred to a new subclass having such working number from its present original classification. Lack of a class number indicates that it is a working number. Lack of the prefix X indicates that it is an original. Since there can be but one original, any following notations should be for cross-references. Since in each project, every working number for each new subclass is different, even though some new subclasses are to be placed officially in one class and some in other classes, the working number alone constitutes complete instruction to the Service Branch for its handling. Since each project is separately handled, the same working number in different projects causes no confusion. The working number is usually different from the final number, though in a few minor projects these two will be the same. In either case, the working number constitutes complete instructions for proper handling.
(2) X 2101 X 4011	A working number with the prefix X signifies that a copy of the patent on which it appears is to be placed as a cross-reference in the new subclass having such working number. Lack of a class number indicates that the number used is a working number.
(3) T 120-14	This designation of an existing class and subclass always appears first when used and indicates that the original copy of the patent on which it appears is to be transferred to the noted existing class and subclass, from its present original classification. Since there can be but one original, any following notations should be cross-reference notations.
(4) T X 120-14 or T X 120-14 if	This designation indicates that the cross-reference copy on which it appears is to be transferred to an existing subclass in the noted class, from its present cross-reference classification which should appear on the face of the copy. Always appears first when used. The "if" is used where the Classifier believes that a cross-reference copy may already appear in the noted subclass.
(5) T X from 120-6 to 120-14 or T X from 120-6 to 120-14 if	As in (4) this is used where copy marked does not show on its face its present cross-reference classification. Always appears first when used. The "if" has the same meaning as in (4).
(6) X 120-20 or X 120-20 if	Used when a cross-reference is to be placed in the noted existing class and subclass. The "if" has the same meaning as in (4).
(7) X back	Used only in connection with (3) where a cross-reference is to be placed in the class and subclass from which the original is transferred, for example, T 120-14 X back
(8) Cancel	This designation is used only on a cross-reference that is not needed in the class and subclass in which it is presently cross-referenced nor as a cross-reference in any other class or subclass.

<i>Marking</i>	<i>Meaning</i>
(9) <b>X4011</b> (sheets 2 and 3 and pages of columns 1 and 2) and pages or columns 1	This designation is used to indicate that only the portions of the patent identified within the parentheses are to be cross-referenced in the working number subclass or existing noted class and subclass. This designation is usually employed where the patent to be cross-referenced has numerous sheets of drawing and many pages of specifications and the portion of the drawing and specification which are pertinent to the subclass in which it is being cross-referenced can be isolated and limited to a particular area of the patent.
<b>X137-344</b> (sheets 2 and 3 and 2)	

The following illustrate examples of markings which may appear on a patent copy using the above designations:

(A)	(C)
(1) 1600	(4) T X 120-14
(2) X 2101 X 4011	(2) X 2101 X 4011
(6) X 120-20 if	(6) X 120-20
(B)	(D)
(3) T 120-14	(5) T X from 120-6 to 120-14
(7) X back	(2) X 2101
(2) X 2101 X 4011	(2) X 2101 X 4011
(6) X 120-20	(6) X 120-20

### 634 *Marking on Patent Copy When a Cross-Reference Is Immediately Made for an Existing Class and Subclass*

In many instances, a cross-reference to an existing class and subclass should be immediately made. Where that is done, the fact should be apparent on the face of the working copy. If the fact is not apparent on the face of the working copy, it may result in a duplicate order which would increase the work of the Service Branch for no useful purpose. Where it is determined as advisable to immediately order a cross-reference for an existing class and subclass, the cross-reference should be marked under the working number for the original classification and a line drawn there-through to indicate the fact of completion of this order, for example:

6901 (working number)

The Service Branch can be given a dummy, namely a sheet initialed by the classifier that

identifies the disclosure and the place of cross-reference, for example:

1695, 116 X 22-19  
GG ÷ 94

### 635 *Cross-Reference Not Indicated by Use of Working Number Until Final Pass*

A working number generally should not be used to indicate needed cross-references before the final pass (see section 638). Until that time, the working subclasses are in a constant state of change. The subclasses are being constantly shifted to obtain the proper order of superiority. Some subclasses may grow too large and require further subdivision, thus establishing additional subclasses with different working numbers to take the subject matter to be cross-referenced. Other subclasses may be found unsuitable and abolished. If working numbers are used to indicate needed cross-references before the schedule has been completed, many will be wrong. The amount of work required to rectify these errors is greater than that required to indicate needed cross-references at that time by writing notes on the patent copy, as set forth in section 636.

Thus, during development of a schedule, information relating to cross-references in the new system should be indicated on the patent copy in the form of notes only. After the schedule has been completed, the working numbers for cross-references to the new subclasses can be written on the patent copies.

### 636 *Notes To Be Placed on Patent Copy*

Throughout a project various notes are placed in erasable pencil upon a patent copy being analysed. These notes are generally of two types (1) notes relating to subject matter which determines the original classification of the patent and (2) notes relating to subject matter to be cross-referenced.

The first type of notes is usually applied on patent copies of patents having complex disclosures, and are applied by the Classifier who first analyses the patent. The notes consist of a short statement setting forth necessary clues to facilitate any future consideration of the patent either for subdividing the subclass into which the patent is placed or during the final pass.

The second type of notes are probably the most important. As stated in section 300 study of the disclosure of a patent involves both an analysis for the purpose of developing the new classification system being worked upon and an analysis to determine all novel subject matter, either disclosed or claimed, that warrants cross-referencing in the system being created or to some existing class or classes.

The subject matter to be cross-referenced in the system being created is marked by notes on the face of the patent copy. These notes are written in pencil using descriptive designations, for example, "X—Aut. cont." It is preferable to draw a line adjacent some portion of the specification on the patent copy to indicate the portion to be cross-referenced. It may also be desirable to underline certain parts of the specification or claims in erasable pencil to delineate a particularly significant disclosure which either determines original classification, or which constitutes subject matter which should be cross-referenced. Such underlining can be used in conjunction with a notation in the adjacent margin of the patent copy stating the significance of the underlining.

Relative to claimed subject matter that must be cross-referenced, the note is in the form of an X opposite the claim or claims covering such subject matter. For example, a patent may include claims drawn to a combination that determines original classification and also to one or more claims directed to subcombinations that require cross-referencing. An X opposite the subcombination claims indicates such need. The controlling claimed disclosure may be a product, with both process and apparatus for its manufacture claimed, which latter claims are marked with an X.

Every effort should be made to keep these notes as brief as possible. The final diagnosis of the patent for schedule creation and copy assignment is on the basis of the printed disclosure not on the basis of notes, therefore the notes should generally serve merely as an aid to direct the attention to the appropriate portions of the disclosure. Notes that are too extensive can defeat their very purpose.

### 637 *Freezing the Schedule*

Ultimately a project becomes a complete picture with respect to all subject matter within its area and its relation to other classes or subclasses in the system. A schedule of subclasses is created for all subject matter which is to stay in the new class. Subject matter to be transferred out is isolated in groups arranged by class number if possible.

At this time several things must be done. A review of the schedule should be made to reduce the number of first line subclasses if possible. Some related first line groups may be shifted to become indented subclasses under a broader family group in the nature of a genus-species arrangement using one of the groups as subject matter for the first line subclass of the broader family group. If no genus suggests itself, the various groups should at least be assembled geographically together as

set forth in section 408. All oversize subclasses, that is, those to which an unusually large number of patents have been assigned should be considered for possible subdivision. If a subclass, for example a subcombination, X-type subclass, has become too large due to cross-references from combination subclasses, a finer division should be made of the X-type subject matter. However, time should not be wasted in breaking down an oversize subclass in an inactive area of subject matter (for example, the class of Whips). Undersize subclasses, that is, one to which an insufficient number of patents have been assigned are usually abolished, generally by assigning the patents to and revision of the title and definition, if necessary, of an existing subclass. Each subclass should be tested as to its placement in the final schedule by reviewing the schedule subclass by subclass and noting if any of the higher subclasses actually provided for the subject matter. If they do, then it shows either that the proposed subclass is positioned too low in the schedule and should be higher, or that it is formed on a wrong basis and should be modified to eliminate the conflict. Upon completion of the above tasks a schedule is substantially frozen, that is, the final stages of work are ready to be undertaken which will lead to a completed system.

### 638 *Final Pass*

After performing the various operations set forth in the preceding section the project will be at a stage in which a substantially complete schedule with reasonably accurate titles is available, rough definitions with notes have been written, and very few cross-references have been indicated by working numbers on the patent copies. The next phase of the project is now undertaken. This phase in-

volves a total review of the work done, and is commonly called "the final pass."

On the final pass, it is usual to start at the bottom of the schedule and to work upwards. The subclasses at the bottom of the schedule normally contain the elemental subject matter with an increase in complexity of subject matter toward the top or toward the first subclass in the schedule. Since the subclasses at the bottom ordinarily receive the bulk of the internal cross-references, a Classifier's recollection of the fine details of the subject matter in these subclasses will be refreshed before cross-referencing into these subclasses is done.

During the final pass the title, definition and notes of each subclass must be evaluated and if necessary amended in view of the subject matter classified therein. A subclass title, definition, notes, and the subject matter of the patents in the subclass must be coextensive in scope; if not, correction to obtain conformity is done at this time.

Further, all claims in every patent are checked to ascertain that the patent belongs in the subclass to which it has been assigned. If it is found that a claim or claims contain subject matter classifiable in a subclass located higher in the schedule, the patent is marked with the number of such higher subclass. Conversely, if a patent does not contain claims which include the subject matter of the subclass in which it is found, nor any subject matter classifiable in a subclass located higher in the schedule, it must then be assignable to a subclass located lower in the schedule. The proper subclass must be located and the working number thereof placed on the patent. Care must be taken to assure that each patent which properly belongs in a subclass being finally reviewed is marked with the working number of such subclass. All needed cross-references are indicated by marking the patent copy with the working number of the subclass in which the cross-reference is to be placed.

### 639 *Desirable Size of a Subclass*

Mention has been made in preceding sections to oversize and undersize subclasses. An attempt will be made in this section to specify some guidelines as to the proper size of a subclass.

No specific formula can be given which will determine the exact number of patents to be included in a particular subclass. Many factors have to be considered in each particular situation. Generally the average number of original patents in a subclass in a project should be about 30 however, this does not mean that the number of patents in every subclass should be within a stated range as shown by the following instances:

(1) During reclassification of a body of subject matter it may be found that a particular concept is in a stage of development, that is it is a new concept, and while only a relatively few patents directed thereto have issued, there is evidence that the number of such patents will increase in the future. A subclass directed to such concept should be created even if only one or two patents directed thereto are found.

(2) A subclass directed to a concept which is clearly different from all others in the system and which concept could not be otherwise adequately provided for generically thereby necessitating a very lengthy search. Again, the number of patents in such a subclass may be very small.

(3) A subclass directed to special type of subject matter as set forth in Section 415. For example, convertible subject matter would be lost unless provided for in a specific subclass, therefore a convertible subclass could be justified even though only a few patents directed to this concept are found.

(4) A subclass directed to a concept which is very involved or in which the dis-

closures are extensive and complicated. It is more helpful to a searcher in this situation for the Classifier to create a relatively large number of small subclasses directed to specific concepts rather than create a single subclass on a broad basis to which a large number of such patents could be assigned.

(5) There may be concepts which are very inactive and in which great majority of the patents assigned to a subclass encompassing such a concept are very old. In this situation, it is desirable to create the subclass on as broad a basis as is practicable so that a large number of patents are assigned thereto. In some recently classified areas of subject matter, subclasses of this type have included as many as 500 or more original patents.

### 640 *Subclasses in Final Schedule Arranged in Continuous Numerical Order*

After the final pass, the working numbers in the schedule must be replaced by the final numbers—the numbers which represent the subclasses in the schedule as published—by substituting for the working numbers, numbers starting with number 1 representing the first subclass in the schedule and proceeding in continuous numerical (whole number) order. When new subclasses are added to an existing class schedule it usually is not possible to follow this procedure. Because of the necessity of maintaining proper subclass superiority the new subclasses are frequently inserted in a position preceding the last subclass in an existing schedule. These added subclasses would either be decimally numbered or be given a set of numbers higher than the number of the last subclass of the existing schedule.

A translation list is then prepared which consists of arranging the working numbers in

numerical order and placing the final number corresponding to each working number adjacent thereto. With this translation list the staff of the Classification Service Branch can replace all working numbers in the definitions and notes and properly mark all patents with their final numbers, in place of the working numbers. A reverse translation list consisting of listing the final numbers in continuous numerical order, starting with number 1, and placing the working number corresponding to each final number adjacent thereto is also prepared for subsequent administrative use by the Classifier.

#### 641 *Processing Outside Cross-References*

Most subclasses revised as a result of a project contain cross-references from some class other than that which included the revised subclasses. These cross-references are referred to as "outside" or "external" cross-references. They must be inspected to determine whether they are to be assigned as originals into a newly created subclass or used as cross-references in a newly created subclass or some existing subclass or canceled. Thus every outside cross-reference officially in any abolished subclass will be accounted for either by transferring it as an original to a newly created subclass or by assignment as a cross-reference to a newly created or existing subclass or by ordering its cancellation.

#### 642 *Processing Foreign Patents and Publications*

Foreign patents and copies of publications in the Examiner's search files within the scope of a project must be analyzed and assigned in the new system. These documents are always

assigned into the new system after the U.S. patents—originals and official cross-references—have been assigned. In most cases these documents are assigned into the new system after the project has advanced to such a stage of completion that the final numbers of the new system's schedule can be used thereby eliminating time required for translation of working numbers into final numbers.

#### 643 *Processing Soft Copies*

The Classification Service Branch checks all patents which were unofficially assigned to all abolished subclasses to see if each is incorporated in the new system. Copies of such documents not in the new system are analysed and, if appropriate, assigned in the new system either as an original or cross-reference. These copies are generally marked with final subclass numbers, as this is done after the final pass.

#### 644 *The Classification Order*

The final result of every classification project is embodied in a Classification Order which makes all changes official. When writing the order, a Classifier should obtain copies of recent orders and follow them for general style. (See Appendix III for a copy of a typical Classification Order.) Incorporated in this order are instructions for the following changes whenever appropriate:

##### IN THE MANUAL OF CLASSIFICATION

- Abolishing an old class
- Establishing a new class
- Abolishing subclasses in existing classes
- Establishing new subclasses in existing classes

Modifying titles of existing classes or subclasses

Changing the position of a subclass or subclasses in a class schedule

Any miscellaneous changes due to errata in the Manual of Classification (e.g. index to classes)

Principal disposition of subject matter from abolished subclasses

Principal sources of subject matter in established subclasses

(The preceding is placed in the first part of the order for ease in entering such changes in the Manual of Classification).

#### IN THE DEFINITIONS

Establishing all new class or subclass definitions and notes

Abolishing the definitions and notes of an abolished class or abolished subclass

Changes in definitions or notes of other classes necessitated by the project.

The Editorial Section of the Classification Service Branch often makes a composite of orders from several projects and composes the final order in uniform style without change in substance.

#### 645 *Reassignment of Pending Applications*

A final phase of a project is the reconsideration of the classification of all pending applications embraced within the scope of the project. This work is started upon receipt of written notice (e.g., a memorandum) from the Head of the Service Branch of the Office of Patent Classification. This notice publishes the effective date of the classification and is distributed to the appropriate Examining Groups, Classification Divisions and the "Allowed Files" section of the Issue and Gazette Branch.

#### 646 *Applications in Issue and Gazette Branch*

Approximately 8 weeks prior to the effective date of the notice of the previous section the classifier:

(1) Prepares the list of all classes or subclasses which have been reclassified.

(2) Submits the list to the Data Processing Branch.

(3) Prepares one form (sample below) for each Group having applications which have been reclassified, and

(4) Submits the forms (3 above) to the Issue and Gazette Branch.

The Data Processing Branch prepares separate lists of all allowed applications in the Issue and Gazette Branch, (a) by serial number and (b) by Examining Groups. Copies of these lists are forwarded to the Issue and Gazette Branch, appropriate Examining Groups and the Classifier.

The Issue and Gazette Branch pulls all the applications and drawings on list "a" and notifies the classifier that they are available in the Issue and Gazette Branch for reassignment.

The Classifier changes the assignment of these applications by drawing a slash mark through the old assignment on the application file, the drawing and on form PO-270 (issue slip), and inserts the new assignment on each of these in green pencil. The Classifier will also initial the issue slip and indicate his Division. The new assignment for each application is also recorded on the copy of the list furnished by the Data Processing Branch and forwards the completed list to the appropriate Examining Group.

Any application which, for some reason, cannot be found in the Allowed Files section, or which is received by this section subsequent to the time when most of the applications are reassigned, will be made available to the Classifier for reassignment as soon as it is located or received.

**SAMPLE FORM LETTER TO EXAMINING GROUPS RECLASSIFICATION  
OF ALLOWED APPLICATIONS**

\_\_\_\_\_  
(date)

Clerk, Group \_\_\_\_\_:

Reclassification of allowed applications in:

Class(es) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Effective (Issue & Gaz. sets date), please phone the undersigned before forwarding to Issue & Gazette Branch any allowed application in the above classes.

\_\_\_\_\_  
Patent Classifier

Ext. \_\_\_\_\_

#### 647 *Applications in Examining Group and Charged Out to Other Branches*

Upon completion of the reassignment of all available applications in the Issue and Gazette Branch, the Classifier may then proceed to reassign all pending applications in the Examining Group and those charged out to other branches of the Patent Office (e.g. Board of Appeals, Docket, Draftsman etc.). The docket clerk of the appropriate Examining Group will obtain as many applications charged out to other branches within the Patent Office as possible. Having obtained such applications, a list of the serial numbers thereof is made. Such applications along with the list and all the pending applications within the scope of the project in the Group are then made available to the appropriate Classification Division for reassignment. All of these applications are reassigned by drawing a slash mark through the old assignment on the file wrapper only and inserting the new assignment (that is class and subclass) using a purple pencil. The new assignment of each application charged out is recorded on the list furnished by the docket clerk.

#### 648 *New Classification Encoded on File Cards, Drawings, Brief Cards, and Issue Prints by Clerk of Examining Group*

A copy of the lists of applications charged out, and in issue, incorporating the changes in assignment of such applications is supplied to the docket clerk of the appropriate Examining Group, along with instructions to effect changes on application file cards, drawings, brief cards and issue prints. The Clerk, by using these lists and the new assignment marked on each file wrapper of the applications in the Examining Group, should effect these changes as of the effective date of the

classification order. The Clerk should also have the drawings, issue prints and brief cards rearranged in accord with the new classification system to facilitate interference searches.

#### 649 *Transfer of Pending Applications*

Where patents directed to a body of subject matter have been transferred from one Examining Group to another as a result of a classification project, all pending applications directed to such subject matter must also be transferred to the Group receiving such patents. Since it was necessary to obtain approval to transfer such patents, it is not necessary to again obtain approval for the transfer of pending applications relating thereto. In effecting such transfer the old Group number is removed from the file wrapper and the new Group number inserted. The applications are then submitted to the receiving Examining Group through the Application Branch accompanied by a transmittal form stating that the application or applications are being transferred as a result of the classification project embodied in the appropriately identified Classification Order. In some instances it may be desirable to allow completion of the prosecution of an application, for example, one in an advanced stage of prosecution, in an Examining Group from which the application would normally be transferred as a result of the classification project. Such application must then be assigned to the new system upon issue. This is an administrative matter to be decided by the Group Managers of the Examining Groups involved or their designees. The Classifier should consult the appropriate Group Managers to determine which applications, if any, should be included in this category.

In some instances, during the reassignment of pending patent applications at the conclusion of a classification project, an application is found which is not directed to the subject

matter of the old class and thus initially incorrectly assigned to such class. Such application being directed to subject matter classified in a class to which no patent was transferred as a result of the project. An attempt should be made by the Classifier to effect acceptance of the application by the Examiner of the class to which the application is properly assignable. If the Examiner refuses to accept the application, reassignment must be effected under normal operational procedures as set forth in section 801 as though no project was involved.

#### 650 *Assigning Documents Into a New Class Bearing the Same Number as the Old Class Which it Replaces*

Where a class has been abolished and a new class created with the subject matter of the abolished class, the new class is preferably given a number different from that of the abolished class. However, in some instances the number of the abolished class is given to the new class. When this is done, encoding instructions ordering assignment of a document either as an original or cross-reference to such new class must include the notation "(new)" placed immediately after the encoding instructions on the patent copy, e.g. Tx 257-11 to 62-10 (new). This procedure must be continued in assigning any patent to the new class, either as an original or cross-reference, after the project patents have been submitted to the Classification Service Branch for processing and extending for a period of three months subsequent to the effective date of the Classification Order making the new class official. When a large number of patents are assigned to the new class during the period stated it is sufficient to indicate, by means of an accompanying memorandum, that the encoding instructions on the patent copies refer to the new class rather than writing (new) on each patent copy.

This same procedure must also be followed when a specified number of subclasses in a class are abolished, and new subclasses are created and given the numbers of the abolished subclasses.

Because of the obvious likelihood of confusion, and the extra work entailed, Classifiers should avoid assigning the number of an abolished class or subclass to a newly created substitute.

#### 657 *Indices and Amendments Thereto*

The U.S. Patent Classification System, to remain suitable for the storage and retrieval of documents directed to patentable subject matter, must necessarily be subjected to frequent changes. Such changes provide for new developments in science and technology, and therefore concurrent revision of the tangible aids to searching which form a part of this system and which are listed and discussed in section 701 is also required. The Classification Order (section 643) of a classification project authorizes and gives instructions for all changes to the Manual of Classification and to the definitions and notes but not those relating to the Index to Classification. Amendment of this Index requires instructions beyond those included in the Order. Another useful index which must be maintained current as the classification system changes is the Patent Index (section 653).

#### 652 *Amending the Index to Classification*

The use of the Index to Classification as an aid to searching and the arrangement of such Index is set forth in section 702. Following a classification project the Index must be amended to reflect any change in the distribution of subject matter from an abolished class or subclass to either an existing class or sub-

class, or to a newly created class or subclass as a result of the project.

Primary responsibility for amending the Index rests on the staff of the Office of Patent Classification. Classifiers are responsible for the accuracy of this Index as well as accuracy in the instructions relating to making a change therein. The Service Branch is responsible for executing the instructions to effect the required changes.

Although based on the official patent classification, the Index to Classification is not to be confined to those terms which appear in titles of classes or subclasses. As a matter of fact no effort has been or should be made to retain in the Index every subclass title. Key words and titles of significant importance should be used and other terms added in an endeavor to make the Index the best practical aid to a searcher. The Classifier must be sure when he adds a title to the Index that the subclass referred to does in fact contain patents relative to that title.

Changes in the Index are ordered by a Classifier as a routine matter after completion of the Classification Order in finishing a classification project. Preparatory to amending the Index a Classifier supplies the Service Branch with a list of all subclasses affected by the project. This list is prepared from the project records which will show the class or classes and subclasses or subclasses in the system that have been canceled or modified in scope. (A subclass may be modified in scope by addition to or removal of subject matter therefrom.) The Service Branch will supply the Classifier with a list of all headings in the Index to Classification which are relevant to the subclasses on the list supplied by the Classifier. Each heading is scrutinized and appropriately changed or canceled. Additional headings which are suggested by a Classifier's notes or personal knowledge are added to the Index to insure maximum coverage.

During a project, as new subclasses are created, new headings that should appear in the Index will be suggested by the patents inspected. A record of suggested headings should be made on Index Change Form, PO-77, using project working numbers, where necessary, for the subclass citation. At the end of the project, the working numbers can be converted to final subclass numbers. Form PO-77 is used also to add or to delete or to amend other titles.

With a view of improving future editions of the Index the cooperation of Examiners and other searchers in pointing out errors, omissions, or in making suggestions for a more helpful treatment of a given subject matter is encouraged.

### 653 *Numerical Indices*

A numerically arranged index, known as the Patent Index and giving the present original classification assignment of U.S. patents, is maintained in card files in the Public Search Room and in ledger books in the Patent Index Section of the Service Branch of the Office of Patent Classification. Either of these two sources may be consulted to verify the current assignment of the original patent copy. In addition the Patent Reference Branch of the Public Search Room maintains records of the cross-reference copy assignments for each patent.

The Data Processing Branch maintains punch card listings of patents, both original and cross-reference, for each subclass.

Most of the issued patents in the U.S. Patent Office may be identified by patent number. However, certain types of patents, all which issued prior to 1836 and those which issued subsequent to 1836 but which are of a special nature, must be specifically identified by means in addition to the patent number when an inquiry about the assignment of such patents is

made either to the Patent Index Section of the Service Branch of the Office of Patent Classification or to the Data Processing Branch. The following represents these types of patents. The symbols in the left hand column are the means which must be indicated, in addition to the patent number, to identify the patent.

- X—Patents issued prior to 1836 without numbers and subsequently numbered serially
- AI—Additional improvement patent last issued in 1861

RE—Reissued Patent

PP—Plant Patent

D—Design Patent

The numerical indices are corrected to show current assignment whenever any patent is re-assigned from one class or subclass to another. Correction of the Patent Index is effected by the Service Branch of the Office of Patent Classification and correction of the punch card system is done by the Data Processing Branch.

## *How to Use the U.S. Patent Classification System*

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- 

### 700 *Introduction*

This chapter is directed to the aids and miscellaneous instructions which are essential to proper use of the U.S. Classification System for storage and retrieval of documents which comprise the prior art and for assignment of patent applications. For a class to be of maximum value to a searcher or other user there must be, between the Classifier and the user of a class, good communication of all information that is directed (1) to the concepts included within a given class, (2) to the delineation with other classes and (3) the overall plan of the class. Since the Classifier who developed a given class is not generally available for interview, it is necessary to obtain such information from the class and subclass titles,

the definitions and notes and from an inspection of the class schedule to determine characteristics of arrangement. Except for technical terms in some of the sciences, words do not have a fixed meaning, but rather meanings that are fluid and changing. Meanings are influenced by many considerations of context and reference, circumstance and association. Thus, it is often advisable to inspect sample copies of the prior art assigned to an area of interest in a class to obtain a full understanding of the meaning of words used by the Classifier in the titles and definitions. To construe the titles and definitions in the light of a rough sampling of the prior art being described will reduce the number of time consuming but fruitless searches caused by a changing and unruly language. It must be

remembered that each class as it exists, supersedes all plans and principles relative to what the classification ought to be.

### 701 *Tangible Aids to Searching*

The actual mechanics of making a search requires knowledge of three tangible aids which are provided by the Office of Patent Classification in addition to some understanding of at least some of the aspects of the system. The aids are:

- (1) The Index to Classification
- (2) The Manual of Classification, and
- (3) Classification Bulletins (class and subclass definitions)

### 702 *Index to Classification; Arrangement of References Therein*

The Index to Classification is an introductory key to the system useful, primarily, for locating clues to an unknown field of search. Use of the Index, unfortunately, is generally resorted to only by a novice to the system. The Index to Classification comprises an alphabetical listing of technical and common names of arts, processes, machines, articles, compositions of matter, etc. with a corresponding numerical citation to a segment (e.g., class or subclass) of the system in which prior art pertinent to a specific inquiry is to be found. The citation obtained through use of the Index is best used only as a guide to the schedule, or portion thereof, of an identified class and its respective definitions and search notes. This is true even though the citation given by the Index appears to state a restricted field of search. It may be necessary to resort to synonyms to locate an entry in the Index.

The Index titles are arranged alphabetically. Titles may consist of a single word or

plural words providing a single or composite title. In case of a plural word first line title of the alternative type, the context of an indented title determines which word or portion of the first line title is modified by such indented title, for example:

#### CABLE AND CABLE MAKING

Bridge suspension

Electric

Electric conductor making and/or joining

Wireworking article making or forming

In this example the first two indented titles modify the term "Cable" and the last two modify the term "Cable Making" of the composite title Cable and Cable Making. Upon revising the Index to Classification for publication, first line titles which have the same first word have been consolidated under a common first line title, for example by changing one to be a type of the other so that the one will appear as an indented type under the other. Indentation in the Index to Classification is restricted to first and second indents as illustrated by the indentations under SPARK, in section 705.

As stated above titles are arranged in alphabetical order. This applies to both first line and indented titles. This alphabetical order applies to every word of plural word titles (including such words as "and", "for", "to", "with", etc.). A cross-reference title, that is, one which makes no reference to a particular class in the Manual of Classification, but merely refers a searcher to a different title, is positioned alphabetically amongst first line titles. For example the title, "AVIARIES (see Birds)", makes no reference to a particular class in the Manual of Classification, but merely refers a searcher to the title "BIRDS". Nevertheless, this title is positioned in alphabetical order in the Index to Classification.

A title other than a mere cross-reference title is followed by the citation of a particular class and subclass in the system in which the subject matter relevant to the title is located.

A plus sign used in conjunction with the subclass citation indicates that the subject matter is located in that subclass and all subclasses indented thereunder. For example in Section 705.

#### SPARK

Arrester----- 110-119+

indicates that patents for spark arrestors are located in class 110, subclass 119 and all subclasses indented under subclass 119.

General notes, explanatory matter and references to search notes are sometimes incorporated in the manner deemed best under the circumstances. For example, a reference to notes relating to particular subject matter that appear in the definition of a class or subclass is placed after a title, generally in parentheses and lowercase letters as illustrated by the following:

#### JOINTS

Fabric fastening (see notes to)--- 160-282+

Such notation indicates that the notes to the definitions of class 160, subclass 282+ must be investigated when outlining a search field for fabric fasteners.

A single master copy of the Index to Classification in the form of typed cards is maintained current in the Service Branch of the Office of Patent Classification. Frequency of publication of the Index is an administrative matter.

### 703 *Manual of Classification*

The Manual of Classification is a key to the system for a searcher with some general knowledge of the system or portion thereof. It has the following major functions: (1) to provide a collection of the schedules, that is, an array of the subclass titles and numbers arranged in organized order under a class title; (2) to list the classes in numerical order by class number; (3) to list the main classes in alphabetical

order and (4) to list the main classes by administrative examining groups. Class and subclass titles are used to identify major and minor segments of the prior art, respectively. These titles are necessarily brief but as suggestive as possible with respect to subject matter contents covered by the segment. Thus, it is best not to depend upon a title standing by itself to delineate the subject matter in a class, or subclass. Reference to respective definitions and notes is not only helpful but in most cases is essential. If a search is to be expeditious and complete, the Manual of Classification should be used only as a key to a class or subclass definition and appended notes, unless the definitions and notes relevant to a given search have been committed to memory by regular use thereof.

### 704 *Classification Bulletins (Class and Subclass Definitions)*

The class and subclass definitions are essential to obtain depth as well as proper breadth of a proposed field of search. Each definition is a definitive statement of the scope embraced by the respective segment of the system that it delineates. A majority of the definitions have accompanying notes. These notes are of two types: (1) notes that supplement definitions by defining terms, giving examples, etc. and (2) notes referring to related disclosures located in other classes or subclasses. Notes to loci of related disclosures may be associated with either a class definition or a subclass definition; such notes, termed search notes, are of utmost benefit in qualifying and explaining the limits of a class or subclass. They not only inform a searcher of the location of related disclosures but also generally state the relationship to, and difference from, other identified disclosure collections. It is intended that each note should guide a searcher to the extent necessary to reach a decision whether to include

or exclude an area containing related disclosures. The definitions and notes of each revised class are published in separate Classification Bulletins, which are identified by a bulletin number as well as by the class number and title. For example, the class and subclass definitions and notes for the class of Glass Manufacturing, are published in Classification Bulletin Number 450. Sets of bulletins are available in each Examining Group, in the Patent Office Search Room, in the Office of Patent Classification and in many libraries. A Search Card is placed with the patents in each subclass as prepared for the Search Room and an Examining Group. Search Cards prepared in recent years include the subclass definition and its search notes. Cards of early vintage merely identify an auxiliary search by class or subclass number.

### 705 *Example of Use of Tangible Aids*

Exemplary usage of the above three aids is illustrated by the following: In connection with a search related to spark plugs, the Index of Classification reveals the following entries:

#### SPARK

Arrestors-----	110	119+
Abrader spark guard-----	51	272
Flue jet pumps-----	230	97+
Illuminating burners-----	240	121
Coils-----	317	157.6+
Gap-----	313	325
Manufacturing-----	29	25.1
Repair-----	316	
Plugs-----	313	118+
Circuit element combined		
with-----	315	32+
Design-----	d26	1
Engine-----	123	169
Making-----	29	25.1+
Prevention dynamoelectric-----	310	220
In electric switch-----	200	144+
Relays preventing-----	317	123+
Switches etc., preventing-----	307	136

SPARKER (SEE IGNITERS)-----	123	146.5+
Internal combustion engine-----	123	146.5+
Toy-----	46	10
Spinner combined-----	46	48
SPARKLERS-----	102	37.4+
SPATS-----	36	2

The reference to a spark plug as a product is to a segment of the system designated as class 313, Electric Lamp and Discharge Devices, subclasses 118+. This segment provides 28 specific searches (subclasses) on spark plugs, the schedule of which is shown below:

#### 118 SPARK PLUGS

119	Sealing-off valve for electrode chamber
120	With fluid feed or air vent
121	Reversible (e.g., part)
122	Removable electrode on shell
123	Plural series gaps
124	Intensifier in center electrode lead-in
125	Movable electrode (e.g., for cleaning, adjustable)
126	Automatically moved (e.g., engine vibration)
127	Cleaner (e.g., movable scraper)
128	Plural insulated electrodes with individual lead-in
129	With transparent part
130	Non-conducting material in or adjacent gap (e.g., restricts spark)
131	Non-shortest line spark and surface spark type
132	Capillary groove or space
133	Ball electrode
134	With radio shielding
135	With particular connector structure
136	Plural part center electrode lead-in
137	Plural part insulating means
138	Electrodes are pure figures of revolution about plug axis
139	Ring or disk electrode (e.g., sector)
140	Plural parallel gaps (e.g., main and standby, serrated electrode)
141	Particular electrode structure or spacing
142	Gap on and along axis
143	Shaped electrode chamber, insulator end, shell skirt, baffle or gas directing means
144	With specific joint structure
145	Between center electrode and insulator

The above array of subclasses might tend to mislead a searcher into believing that all aspects of a search on spark plugs are at this location. Inspection of the notes listed under the definition of subclass 118 alone indicates that there are a plurality of additional search areas within class 313 for related matter as well as many search areas in other classes that should be considered for possible search. Additional search notes are included under the definitions of subclasses indented under subclass 118. This situation is frequently the case and points out the need for concurrent usage of the Index to Classification, the Manual of Classification and the class and subclass definitions.

#### 706 *Reading Subclass Titles and Definitions*

Instructions for reading subclass titles and definitions are relatively simple: The title of a selected subclass in a class schedule array must always be read as a composite of (a) the title of the class, and (b) the title of the selected subclass and of all subclasses under which it is indented. For example, certain subclasses in the class of Glass Manufacturing, are as follows:

CLASS 65, GLASS MANUFACTURING	
336	GATHERING OR DRAWING POOL TYPE FURNACE
337	Supplemental heating or heat exchange means associated with pool
338	With deputer, draw ring or draw shield
339	Separate and distinct means defining pool (e.g., floor supported dam)
340	Movably mounted
341	Cascadingly connected
342	By bridge
343	Floating bridge
344	With deputer, draw ring or draw shield
345	By suspended baffle

The full title of subclass 343 should be read as follows: Glass Manufacturing, Gathering or Drawing Pool Type Furnace, Separate and distinct means defining pool (e.g., floor supported dam), By bridge, Floating bridge.

Likewise, the definition of a subclass is dependent on the class definition as well as that of any other subclass under which it is indented; for example, the definition of subclass 343, above, is dependent on and therefore includes the limitations of the class definition of class 65, as well as the definition of subclasses 336, 339 and 342, in that order. Neither the subclass title nor the subclass definition are to be read out of context or in the abstract.

#### 707 *Superiority as an Aid*

Another essential aid to the proper use of the system is intangible rather than tangible in nature. This aid, the concept of superiority, comprises a set of principles establishing priority for assignment of subject matter among the classes and among the subclasses within a class. It is necessary to emphasize that the concept of superiority is fundamental to the Patent Office Classification System, both in development of new segments for the system as well as in the administration of the existing system. The continued orderly arrangement of the documents which comprise the prior art in the system is dependent on a proper application of such principles for each assignment of an accession (e.g., new patent, etc.) in the system. These principles and their application are explained in the following sections in connection with instructions for (1) assignment of documents into the system for storage and (2) searching in the system for retrieval of the prior art (i.e., the documents previously stored).

### 708 *Assignment of Patents or Applications; Superiority Among Classes*

The classification system is used not only for orderly storage and retrieval of the prior art, which is used in the examination of pending applications for patents, but also for assignment of pending applications to a specific class and subclass. Applications directed to a given claimed disclosure are brought together with the pertinent prior art in an Examining Group. Thus, the Patent Examiner best qualified in a given field of science or technology, and having jurisdiction of the prior art relevant thereto, receives those applications directed to his specialty for examination. The assignment of applications into the system on a claimed disclosure basis (see section 302) also provides a systematic arrangement of pending applications necessary for conducting interference searches. (As stated in section 647, upon completion of a reclassification project, all pending applications within the area of the project are reassigned in accord with the new system and the drawings or brief cards are rearranged in the new subclass array in order to provide for interference searches.)

The process of assigning an application or patent in the system is, in some respects, similar to the process used in retrieval of the prior art. In either case it is necessary to obtain a clear and complete understanding of the claimed and unclaimed disclosures in the application or patent. The majority of patents and applications have but one claimed disclosure which defines a single invention generally as a simple whole (e.g. a product, a process, or a machine, etc.) and present no problem as to which one of several claimed inventions should be chosen for making the assignment. Once the subject matter of a claimed disclosure is understood, the next step is to select the class that provides for it. One familiar with the segment of the system that provides for storage

of a given claimed disclosure will know the pertinent specific class and can rapidly locate the proper subclass by scanning that class schedule from the top subclass downwardly. Instructions for selecting the proper subclass within a selected class are given in detail starting with Section 714. If the class that provides for a given subject matter is not known, the Index to Classification (or, as a second choice, the list of "Classes Arranged in Alphabetical Order," which is found in the front portion of the "Manual of Classification") should be used for obtaining suggestions of classes to be considered. A list of the most likely classes should be made and their definitions and notes should be studied. Since the definitions and notes state the superiority among those classes which provide for related subject matter, either by a positive statement of the distinctions between certain classes or by merely stating the location of other related subject matter, the information obtained by use of the definitions and notes in nearly every case is sufficient to enable assignment of the patent or application to the proper class and thence the subclass.

### 709 *Assignment Among Classes Involving Diverse Claims*

A patent or application that includes diverse types of claimed disclosures (for example, combination and subcombination, or product and process, etc.) which are often classified in different classes in the system presents a problem as to which of the claimed disclosures should control assignment. Certain of the principles of superiority are used in such cases to obtain uniformity in selection of the claimed disclosure that will control assignment. After determination of the controlling subject matter, assignment is based on that claimed disclosure as though it were the only one in the applica-

tion or patent. (In the case of an application the Examiner having jurisdiction of the subject matter of the controlling claim has the responsibility for the prosecution of all claimed disclosures therein. See the Manual of Patent Examining Procedure, Chapter 800.) To determine which one of plural claimed disclosures to diverse inventions that have been presented in a single application or patent is to control assignment in the system, the following principles must be applied, stepwise, in the order presented, until the controlling subject matter is identified.

### 710 *Superiority Among Classes: the Most Comprehensive Claim*

The claimed disclosure setting forth the most comprehensive combination (for example, a claim to a combination compared to a claim to a subcombination or element), if there is one, controls assignment of a patent or application among classes. This principle makes it necessary to scan and compare all claims in an application or patent in order to select, as the controlling claim, the claim that is directed to the most comprehensive combination when compared to other claimed disclosures in that application or patent. This is illustrated by comparing the following two claims, which not only differ in comprehensiveness but also are directed to diverse categories of subject matter, each of which is assignable to a different class:

**C1.1.** A laminated sheet comprising two sheets of aluminum bonded with an intermediate layer of a binder; said binder comprising an elastic, self-vulcanizing rubber-like cement, the adjacent faces of the panels being roughened in a cross-hatched pattern to facilitate adhesion of the cement, two opposite edges of the sheet being notched with corresponding dovetail cutout portions.

**C1.2.** A process comprising scoring the faces of two aluminum panels in a cross-hatched pattern,

applying a binder to the scored faces, pressing the coated faces together to secure the panels and form a sandwich and then bending the sandwich and securing the opposite edges to each other to form a tube.

Claim 1 claims a product comprising a laminated sheet, claim 2 claims a process of making such sheet, but includes the further steps of bending the sheet and securing its edges to form a tube. The process claim thus contains a greater extent of subject matter than does claim 1, and therefore is the more comprehensive claim. Assuming that separate classes, provided for the subject matter in claims 1 and 2 respectively, a patent containing these two claims would be assigned to the class providing for the subject matter of claim 2. This illustrates that a patent containing plural claims individually classifiable in separate classes and of varying degrees of comprehensiveness is assigned to the class providing for the subject matter of the most comprehensive claim. Notes in the class definition of the class providing for the most comprehensive claim should be scanned for a possible exception to this rule in those cases where the claimed disclosure includes a notoriously old or nominal combination (see section 305).

### 711 *Class Superiority Among Categories of Subject Matter*

Where diversity of claimed disclosures is that caused by the presence of claims to several statutory categories of subject matter (the claimed disclosures being of the same comprehensiveness), all claims must be scanned to enable assignment to the class providing for the category which appears highest in the following list:

- (1) Process (of using product 2, e.g., using a fuel or radio transmitter).

- (2) Product (of manufacture, e.g., a fuel or radio transmitter).
- (3) Process (of making product 2).
- (4) Apparatus (to perform 3 or to make 2, e.g., machine, tool, etc.).
- (5) Material (used in 3 to make 2).

In this list there is a descending order of priority with item 1 having the highest priority of taking, item 2 the next highest, etc. Thus, in situations of this type, assignment is to that class providing for the subject matter appearing highest on the above list, disregarding the claims directed to the other categories only for the purpose of assignment of the "original" copy of a patent or the assignment of an application. For example, as between a claim to a product of manufacture (for example, a radio transmitter) and a process of manufacturing the same, the claim to the product would control classification among classes; however, a claim to a process of using the transmitter would control over a claim to the transmitter or process of making it. In the case of an allowed application that is, an application that is to be issued as a patent, or a patent the claimed disclosures to the other categories must be appropriately cross-referenced into the system in accordance with the principles set forth in section 528.

It must be emphasized that the principle that the most comprehensive claim controls classification supercedes the above order of superiority. In the example of section 710 above, the patent had claims to a process of making a product and to the product, but since the claim to the process was more comprehensive than that to the product the order of superiority set forth herein was disregarded and assignment was to a class providing for the process. This principle is not applicable within a single class, since then the relative location of the subclass in a particular schedule determines superiority. See section 714.

## 712 *Class Superiority Among Types of Subject Matter*

The superiority among classes which provide for types of subject matter as shown by the list below is used only when principles of sections 708 through 711 fail to determine the controlling class:

- (1) Subject matter relating to maintenance or preservation of life is superior to subject matter itemized in 2–4 below.
- (2) Chemical subject matter is superior to electrical or mechanical subject matter.
- (3) Electrical subject matter is superior to mechanical subject matter.
- (4) Dynamic subject matter (that is relating to moving things or combinations of relatively movable parts) is superior to static subject matter (i.e., stationary things or of parts nonmovably related).

## 713 *Class Superiority Based on Listing of Classes in Manual of Classification*

It is emphasized that a listing of the classes either in numerical or alphabetical order lacks significance as far as superiority is concerned. The number of a class is a mere mark of identification which has been assigned arbitrarily. Since the title of a given class is an accident of language, alphabetical order of the classes will vary from one language to another. A showing of the organization of applied sciences into five major groups is published in the introductory pages of the Manual of Classification. Within each of the five groups there has been an attempt to list the classes in a hierarchy that would show superiority. Some groups show superiority very well, whereas others show it less well or not at all. Notwithstanding, as a last resort, the controlling subject matter is sometimes determined by use of the relative positions of the classes in a given group. The controlling subject matter is that which is pro-

vided for by the class which appears highest in a given list.

It is not necessary generally to apply each of the principles set forth in sections 710–713 above to make an assignment. In certain instances there may be no question of differences in the comprehensiveness of the claimed disclosure, in which case the principle stated in section 710 would not apply, or the claimed disclosures may all be directed to the same statutory category, in which case the principle of section 711 would not apply. When two or more of the principles are applicable in a given patent or application, they should be applied, step-wise, in the same order that sections 710–713 are presented.

Consultation with an Examiner who is experienced in the search area under investigation or with a Classifier in the Office of Patent Classification is recommended in difficult cases.

#### 714 *Superiority Among Subclasses Within a Class*

Within a class the relative location of a subclass in the array of subclasses determines superiority. The top or first subclass is noted as having the highest priority of taking and the last or bottom subclass the least. Once the proper class is identified, it is necessary to select the proper subclass by scanning the schedule progressively from the top subclass to the bottom. Only first line subclasses are considered on the initial downward scan. Each first line subclass is evaluated until a first line subclass is reached that will provide for all or part of the claimed disclosure of a given search as verified by the subclass definitions. The selected first line subclass and its indented (dependent) subclasses, if any, provide for the basic search of the given claim or search problem, and conversely accept subject matter within the definition for assignment. If such a first line subclass has coordinate subclasses

indented thereunder, these indented subclasses must be scanned downwardly and evaluated individually, since the first occurring of the indented subclasses which provides for the given subject matter takes the same for assignment. If such an indented subclass itself has coordinate indented subclasses, the above process is repeated until the ultimate indented subclass is reached that will take the subject matter for assignment on the basis of claimed disclosure.

Having determined an assignment to an ultimate position based solely on the claimed disclosure, in certain situations consideration must then be given to the total disclosure in connection with any further indented subclasses (if any) under the subclass which was selected on the basis of claimed disclosure. In order to reduce the number of cross-references placed in a system and to provide a complete search of specifically identified subject matter in an indented subclass, it has been found advantageous to deviate from the general principle that a patent is assigned strictly on claimed disclosure and to require assignment on the basis of the total disclosure—that is, assignment to an indented position beyond that providing for the claimed disclosure (see section 308). The practice of carrying an assignment into an indented subclass on disclosure has been followed generally under the circumstances in which the parent subclass is a subcombination and the indented subclasses are combinations that include the subcombination parent. An example of such an assignment is demonstrated by using the array of subclasses shown below, which are under the title “ROLLING MEANS TO FORM SHEET OR STRIP.” For example, a patent having a claimed disclosure that would be assigned to subclass 253 on the claimed disclosure, must be assigned to subclass 257 if the total disclosure met the limitations of subclass 257 but not those of subclasses 254 and 255.

Since a subclass is inclusive rather than exclusive (see Chapter One), the recitation in a claim of limitations in addition to those required by a subclass definition will not preclude assignment to that subclass. This is illustrated by the following example:

- 253 ROLLING MEANS TO FORM SHEET  
OR STRIP
- 254 With treating means
- 255 With corrugating or surface imprinting  
means
- 256 Roll coating with planar platen
- 257 Reciprocating platen

Both subclass 254 and 255 are to greater combinations than that provided for by the parent subclass 253, but this array of subclasses is such that subclass 253 is inclusive of its own subject matter in combination with other subject matter that has not been provided for in subclasses that appear in the schedule above subclass 253 or in some other class. A patent having a claimed disclosure assignable to subclass 257 and also including a claimed disclosure to an unprovided for combination under subclass 253 is assigned to subclass 257 irrespective of the presence of the disclosure of the unprovided for combination. Thus, an unprovided for combination or the subcombination must be searched in the parent and all indented subclasses thereunder. See section 308. However, a search to a combination provided for by an indented subclass is limited to that subclass.

In a genus-species subclass array where plural species are provided for indented under the generic subclass, assignment on the basis of claimed disclosure is followed where generic claims only appear in a patent having disclosed species. Thus a patent having genus claims only and unclaimed but disclosed provided-for species is assigned as an original copy in the first appearing disclosed species subclass.

A patent having genus claims only and a disclosure to an unprovided-for species is assigned as an original copy in the generic sub-

class in that the generic subclass is the first appearing subclass that can take the unprovided-for species.

For example, in the following subclass array:

- Generic subclass
- subclass species A
- subclass species B

(1) If a generic claim only is present, with disclosures of species A and B, the patent is assigned as an original to subclass A as an original and should be XR'd to subclass B.

(2) If a generic claim only is present with disclosures of species A and C, the patent is assigned as an original to the generic subclass and should be XR'd to subclass A.

However, where in addition to the generic claim there is a claim to a provided—for species, the patent is assigned to the species subclass unless there is also a claim to an unprovided—for species, in which latter case the patent is assigned as an original copy to the generic subclass.

For example in the subclass array above:

(3) If a generic claim is present and also a claim to species A with disclosure to species C the patent is assigned as an original to subclass A and should be XR'd to the generic subclass.

(4) If a claim to species C is present and also a claim to species A, the patent is assigned as an original to the generic subclass and is XR'd to subclass A.

In all of the above instances cross-reference copies, either mandatory or optional, are assigned to appropriate subclasses. Thus a generic search to be complete must include the genus subclass and all indented species; a complete search for a provided species need be made in only the species subclass; and a complete search for an unprovided species need be made only in the generic subclass.

As between coordinate subclasses each of which provides for two different and distinct characteristics in a schedule that fails to provide for the combination of the two characteristics (where the combination is not provided for elsewhere), a claimed disclosure to such combination is assigned to the first appearing subclass and cross-referenced to the second.

### 715 *Nonconformity in Practice*

In the past there has been some nonconformity in the practical application of the principles stated in sections 308, 309 and 714. Thus, it is necessary to be on the alert for diversity of practice respecting assignment within a class on disclosure and to vary search techniques to compensate for any diversity known to exist or observed. Nonconformity has nearly always been one or the other of the following types:

(1) In some classes the practice of carrying an assignment to an indented subclass as practiced in a parent subclass with indented combination subclass array (section 308) has been extended unofficially to a genus-species subclass array. In such instances an unprovided for species, even when claimed, has been assigned to a subclass providing for another species which has also been disclosed. This has been done often with no cross-reference back to the generic parent subclass. When such a condition is known or detected, an unprovided for species must be searched for in the parent and all subclasses indented thereunder.

(2) In certain chemical compound or composition classes the general principle of assignment on claimed disclosure has been followed where the parent subclass provides for a subcombination and the indented sub-

classes for combinations including the subcombination as a part thereof.

### 716 *Exceptions to General Principles of Superiority*

A collection of pertinent prior art, which is located contrary to written definitions or notes or to the principles controlling assignment, will over-ride all other rules and considerations and will control assignment of like subject matter until such time as corrective reclassification is effected. The Examining Group having the pertinent prior art must be assigned applications corresponding to that art whereby disclosures that are alike are kept together.

Class definitions must be scanned for possible exceptions to the principles of superiority inasmuch as disclosures in a given area of technology may have required deviation from these principles. Any deviation from the principles of superiority will be mentioned, and explained if necessary, in the class definition. For example, class definitions must be scanned for possibility of an exception to the order of superiority explained in section 711 which would permit assignment of a disclosure to an article of manufacture (for example a box) which is distinguished solely by the composition from which it is made into the appropriate composition class. For a detailed discussion on other exceptions to assignment based on the claimed disclosure principle, see sections 304 to 307, inclusive.

A claimed disclosure to a hybrid of categories comprising a product defined by a process are occasionally encountered in applications. Under these circumstances the application is to be assigned to the proper process class for the purposes of examination. If allowed, the application should be assigned to the proper product class and cross-referenced back to the process class where it was examined, if different.

### 717 *Assignment of an Allowed Application*

Assignment of an allowed application (that is, an application that is to be issued as a patent) into the system is somewhat simpler than assignment of a new application, inasmuch as the field of search recorded in the file wrapper indicates, for the most part, those areas in which a copy of the patent should be placed. The effect of prosecution on the claimed disclosure must be considered and sometimes compensated for when assigning this type of application. The allowed application must be assigned on the allowed claims in the application by using the principles of superiority given above. Mandatory placement of cross-reference copies is required for each distinct invention claimed in the application, except when there has been provided an arrangement of subclasses with appropriate search notes which will guide a searcher to all places where the subject matter may be found (see section 528). When it is found, upon preparing an application for issue, that a mandatory copy to a subclass which has not been searched is required, a search of that subclass is also required. Additional cross-reference copies to unclaimed disclosures are generally placed in the system when in the judgment of the Examiner or Classifier such disclosures are believed to be novel and are disclosed in sufficient detail to be considered of value as a reference (see section 529). Unclaimed disclosure may comprise disclosure of an element (or step) of a claimed combination as well as disclosure not referred to in any claim.

### 718 *Retrieving Information*

Before a retrieval search in the physical sense is started, there should be a formulation of a specific search problem and an outlining of a field of search to resolve the problem. Since a claim in a patent application or patent con-

stitutes a search problem, the burden on the searcher investigating claims is to obtain a full understanding of the claim in the light of the specification, preferably by sketching it or preparing a flow sheet thereof. After comprehending the search problem or problems, a field of search for each problem should be outlined and reduced to writing. Outlining a field of search by a novice and by one familiar with the classification system usually will entail a slight variation in the procedure.

If a searcher is unfamiliar with the system or with the location of specific subject matter therein, the Index to Classification should be the aid used first in locating and listing segments (classes or subclasses) of the system that appear to be pertinent to a given search problem. After locating a pertinent segment through the index, the procedure in competing the outlining of a field of search should be the same as that stated in the next paragraph, steps 2 through 7; this procedure should be followed even though the citation given by the index appears, on the surface, to be a complete answer.

As stated before, use of the Index to Classification is sometimes omitted by those very familiar with the system or a portion thereof, or by necessity in those rare instances when the Index fails to reveal a field of search. The procedure is to successively:

- (1) Scan the class titles in the alphabetical or numerical list found in the front of the Manual and note those classes that appear to include an answer to a given search problem.

- (2) Carefully study the class definition and the notes thereto of the class so listed which has a title that appears to answer the problem the best.

- (3) Scan the schedule of subclasses in the selected class (if consideration of the class definition confirms that the selected class

provides a field of search) and investigate first line coordinate subclasses only.

(4) Select for further investigation that first line subclass which has a title and definition that best appears to include the solution to the search problem;

(5) Carry the investigation to subclasses indented, if any, under the subclass selected in step 4;

(6) Select the ultimately indented subclass which has a title and definition that best appears to include the answer to the search problem;

(7) Physically inspect the prior art stored in the subclasses, which appears the most likely to be productive and select those copies of the prior art that correspond to the search problem;

(8) If the last mentioned subclass (step 7), proves fruitless, continue the search in the parent subclass(es) or to the miscellaneous subclass as well as to any subclass higher in the schedule, the title and definition of which indicates possibility of inclusion of matter pertinent to the search. In searching for specific subject matter provided for within a subclass array consisting of a parent subclass of the subcombination type and one or more subclasses to combinations indented thereunder, all the subclasses must be searched either when searching for the subcombination or when searching for a specific combination for which no subclass has been provided. For example, in the subcombination — indented combination subclass array shown below it is necessary in searching for a combination for which no special subclass has been provided to search subclasses 54 to 58 inclusive. A search of subclass 54 only under these circumstances is incomplete.

54 PORTABLE RECEPTACLE LID APPLYING

55 With receptacle transfer means

56 With lid fastening  
57 With gathering of contents  
58 With lid locating means

Expansion of a search along the lines indicated in the above paragraphs should not be practiced in chemical classes where it is not applicable.

In a subclass array of species subclasses under a parent subclass which provides for the genus, the search pattern is different. A search for a genus must include the generic as well as all the species subclasses. However, a complete search for an unprovided for species is the generic subclass. Where non-conformity in actual classification assignment of patents is revealed by inspection of patents in the array, an expansion of a search into all of the indented subclasses is required.

(9) If the search proves fruitless, it will be necessary to repeat steps 4 through 8 in another first line subclass selected by additional scanning of the class schedule, repeating this procedure and investigating the definitions and notes of all subclasses that look promising.

(10) After completely exhausting the reasonable possibilities of the first class selected without finding appropriate prior art, repeat steps 2 through 9 in that class selected as the second most likely in step 1.

Failure to locate relevant prior art—even though not anticipatory—is usually indicative that the proper place in the classification system has not been searched. Patent Classifiers in the Office of Patent Classification are available for consultation in outlining a field of search.

## 719 *An Exhaustive Search*

It is considered necessary by some searchers in conducting an exhaustive (for example, infringement) investigation to search not only

as outlined in the above paragraphs but also to extend the search upwardly above the proper locus of a specific search problem into areas in which the subject matter of the search might be found in combination with some other subject matter. Since in some instances cross-reference copies in a given search area provide the only clue to the location of subject matter of interest located elsewhere, it may be very advantageous for a searcher to determine the original classification of a pertinent cross-reference for extension of a search into the segment of the system from which such cross-reference was made. An exhaustive search involves an administrative decision in view of practical budgetary limitations.

## 720 *Summary of Principles of Superiority*

### SUPERIORITY AMONG CLASSES

A. With respect to an application or patent directed to one claimed disclosure assignment is to the class that is the locus of the prior art for the same subject matter. The identity of the proper class is established through study of class definitions and notes of classes suggested by the Index to classification or lists of classes or by personal knowledge of the location of the prior art.

B. With respect to an application or patent including claimed disclosures to diverse inventions, the principles listed below must be considered and applied, if appropriate, stepwise, in the order listed to select the single disclosure that will control assignment as in A above:

(1) Most comprehensive claimed disclosure governs.

(2) Order of superiority of statutory categories of subject matter.

(a) Process (of using product b, e.g. using a fuel or radio transmitter)

(b) Product (of manufacture, e.g. a fuel or radio transmitter)

(c) Process (of making product b)

(d) Apparatus (to perform c or to make b, e.g. machine, tool, etc.)

(e) Material (used in c to make b)

(3) When, and only when, principles 1 and 2, given above, fail to solve the question of the controlling class, the relative superiority of types of subject matter as shown by the following list is used:

(a) Subject matter relating to maintenance or preservation of life is superior to subject matter itemized in b-d below.

(b) Chemical subject matter is superior to electrical or mechanical subject matter.

(c) Electrical subject matter is superior to mechanical subject matter.

(d) Dynamic subject matter (i.e. relating to moving things or combinations of relatively moveable parts) is superior to static subject matter (i.e. stationary things or of parts non-movably related).

### SUPERIORITY AMONG SUBCLASSES OF A SINGLE CLASS

Among subclasses within a class schedule, the first subclass reached, upon scanning coordinate subclasses from top to bottom, that provides for the claimed disclosure governs. As between coordinate subclasses each providing for a different characteristic, a claimed disclosure to a combination of the two is placed in the first appearing subclass in all instances where such combination is not provided for in some preceding subclass or in some other class and a cross-reference is assigned to the other. Assignment is to be carried into indented subclasses, if any, under the so determined coordinate subclass until the ultimate indented subclass is reached that provides for the claimed subject matter.

## *Administration of Existing Classes*

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### *Sections:*

- 800 Introduction
- 801 Classification Decisions
- 802 Decision Suitable for Indexing
- 803 Written Decisions That Are Not Indexed (i.e. Form PO-738)
- 804 Consultation With Classifier Having Jurisdiction of Class to Which Application Pertains

### *Sections:*

- 805 Reassignment of a Patent or Reassignment, Addition, or Cancellation of an Official Cross-Reference
  - 806 Reviewing the Official Gazette to Verify Proper Assignment of Newly Issued Patents
  - 807 Amending Title, Definition, or Notes
  - 808 Assisting a Searcher in Outlining a Field of Search
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### 800 *Introduction*

In addition to the creation and development of classification systems, a Classifier is assigned certain classes of the total classification system which he must administer. The administration of a class places certain responsibilities upon the Classifier with respect to such class, which generally include:

(1) Decisions in classification disputes involving a patent application assigned to the class.

(2) Approving the assignment of a patent either as an original or cross-reference to the class.

(3) Reviewing the Official Gazette to note newly issued patents in the class and to consider the possibility of grossly misclassified patents.

(4) Appropriately amending any title, definition or note in the class whenever found necessary.

(5) Assisting a searcher, from within or outside the Patent Office, in interpreting a title, definition or note in the class, or out-

lining a field of search involving the subject matter of the class.

Since many of the older classes fail to conform, in widely varying degree, to principles now used in creating a new class, administration of a particular class requires a study thereof to determine the methodology used in creating such class. Each class must be administered in accordance with the principles as used in its creation to perform the above listed tasks effectively.

### 801 *Classification Decisions*

Whenever there is a difference of opinion amongst Patent Examining Groups as to the proper assignment of a patent application, which cannot be resolved by a verbal advisory opinion by an appropriate Classifier, the application is submitted to the Office of Patent Classification which has jurisdiction respecting questions of assignment in accord with criteria set forth in M.P.E.P. section 903.08(a) and 903.08(d). Where a difference of opinion relates to classification of an application

at the time of allowance (M.P.E.P. 903.07+), a ruling by a Patent Classifier, who has jurisdiction of the controlling subject matter in the application, is obtained. The decision of the Classifier in this case is indicated merely by his initialing of the completed issue slip (Form PO 270). See M.P.E.P. 903.07(b). Responsibility for resolving a controversy arising from an assignment to classes or subclasses within an Examining Group lies with an appropriate official of the Group; however, in difficult cases an advisory opinion may be requested from the Office of Patent Classification.

Upon receipt of the application by the Office of Patent Classification, it is transmitted to the Classification Division having jurisdiction. The Classification Division will then render either a decision suitable for indexing or a decision using Form PO-738 depending on the situation involved.

### 802 *Decision Suitable for Indexing*

Any application submitted under M.P.E.P. section 903.08(d) may at the discretion of the Classifier be considered of such importance as to warrant a decision suitable for indexing.

Any decision rendered in a controversy relative to the question of proper assignment of patent applications which may serve as a good precedent is indexed. That is, a copy of the decision is maintained on file and available for reference purposes in the Service Branch of the Office of Patent Classification. These decisions are maintained, primarily, for the benefit of the Office of Patent Classification. They serve as guides in the event that similar situations subsequently arise. Some of the indexed decisions set forth detailed lines of distinction among classes not elsewhere stated, or interpret definitions. Thus, as a general rule, any decision should be indexed which in the judgment of the Classifier writing it: (1) contains some teaching or distinction that may serve

as a useful precedent or (2), is informative beyond the published class definitions and notes.

A decision suitable for indexing consists of (1) a detailed discussion of the evidence (either allegations set forth in the transmitted memoranda or cited patents), (2) reasons for the assignment and (3) a teaching or a new line of distinction established by the decision.

The application along with a copy of the decision is then returned to the Examining Group to which it was originally assigned for transfer through the Application Branch, if necessary, in accordance with the decision. A copy of the decision is also forwarded to each Examining Group involved in the dispute and to the Editorial Section of the Service Branch of the Office of Patent Classification to be placed on file, properly indexed, to be available for future reference.

### 803 *Written Decisions That Are Not Indexed (I.E., Form PO-738)*

Written decisions which are not indexed are rendered on Form PO-738 and may be given on any application whether submitted in accordance with M.P.E.P. section 903.08(a) or in accordance with M.P.E.P. section 903.08(d) at the discretion of the Classifier. This decision consists of properly filling out Form PO-738, and under "Remarks" stating the reasons concisely but as clearly as possible. If the application is assigned to an Examining Group other than the Group which has submitted the application for decision, a slash mark, in erasable pencil, is drawn through the old Group number on the application file wrapper and the number of the Group to which the application is assigned is inserted along with the Classifier's initial and his Division. The application with a completed Form 738 attached is returned to the Examin-

ing Group to which it was originally assigned for transfer through the Application Branch, if necessary, in accordance with the decision.

#### 804 *Consultation With Classifier Having Jurisdiction of Class to Which Application Pertains*

If it is determined that an application pertains to a class over which another Classifier has jurisdiction, such Classifier should be consulted and when agreement is reached and the application is assigned to the Examining Group having the class, the decision—whether a Form PO-738 type or a type suitable for indexing—must not only contain a statement that the Classifier having jurisdiction of such class has been consulted and concurs in the decision rendered, but also must be signed by both Classifiers.

#### 805 *Reassignment of a Patent or Reassignment, Addition or Cancellation of an Official Cross-Reference*

The reassignment of a patent (M.P.E.P. section 903.05) or the reassignment, addition or cancellation of a cross-reference (M.P.E.P. sections 903.06 and 903.06 (a)) within the classification system must be approved by the Classifier having jurisdiction of the class to which the patent is to be transferred or cross-referenced. Upon deciding that a change is necessary the Classifier must instruct the miscellaneous transfer desk of the Classification Service Branch to take proper action. Instructions may be given either on a memorandum or directly on the patent copy but must always include the initials and Division of the Classifier.

When the instructions are given directly on the patent copy a penciled slash mark is drawn through the class and subclass designation on

the upper left hand corner of the patent copy and the new designation written in erasable pencil beneath the old designation along with the initials and Division of the Classifier, for example:

TX 200-50 A.T.Z. Div. 94

When the instructions are given on a separate memorandum, the number of the patent should be listed, then the specific instructions given followed by the initials and Division of the Classifier, for example:

1,653,623 TX from 100-25 to 200-50. A.T.Z.  
Div. 94

For a uniform system of marking a patent copy for reassignment purposes either as an original or cross-reference, see section 633.

#### 806 *Reviewing the Official Gazette to Verify Proper Assignment of Newly Issued Patents*

The Office of Patent Classification, at present, does not formally review newly issued patents. However, it is possible for a Classifier to remain aware of the current subject matter under his jurisdiction by reviewing the claim or claims of newly issued patents as they appear in the Official Gazette bearing in mind that the claim published in the Official Gazette is often not the claim controlling classification and that time does not usually permit of more than an occasional spot check, or close investigation of an apparently misclassified patent. If it appears that a patent is misclassified and therefore improperly assigned as indicated by such claim or claims, the Classifier should order a copy of such patent and review all the claims therein to determine if it is improperly assigned. If it is in fact determined that such patent is improperly assigned, the necessary action should be taken to have such patent properly reassigned to the proper

class or subclass. With respect to a newly created classification system, this must be done until it is demonstrated that assignment by the Patent Examiner is accurate.

### 807 *Amending Title, Definition, or Notes*

Whenever a Classifier becomes aware of a deficiency in the title, definition, or notes of a class or subclass under his jurisdiction, he must amend them to remove the deficiency. For example, in writing a classification decision suitable for indexing the Classifier may establish a new line of distinction between one class and some other class or he may discover an error in an existing definition. Unless this new line of distinction is clearly set forth in the definitions and notes of the classes involved, or the error corrected, it will not be observed by others in the future. Therefore, the Classi-

fier must amend the appropriate definition and notes to incorporate such new line of distinction, or to correct any error found therein.

### 808 *Assisting a Searcher in Outlining a Field of Search*

In many instances a Patent Examiner, a Patent Attorney, or others desiring to conduct a search may be confused by a particular title, definition, or note of a class or subclass. The Classifier having jurisdiction should be consulted to assist in directing attention to and interpreting such title, definition or notes. The Classifier can upon request, assist searchers by outlining a field of search for subject matter provided for in a class over which he has jurisdiction. Also, a Classifier may often be in the best position to outline a field of search for related or equivalent subject matter.

## APPENDIX I

### *Schedules of Classes*

- 65 Glass Manufacturing
- 172 Earth Working
- 222 Dispensing



Original Classification A. B. Curtis A. C. Hodgson, P. J. Isakov, I. R. Lady, D. M. Pritchett, S. I. Serota 1962 Definitions in Bulletin No. 450		PROCESS	
		43	Bonding of glass to a formed part By or with coating at joint interface of a formed part prior to bonding
1	FILAMENT OR FIBER MAKING	44	With embossing or corrugating
2	Processes	45	With glass part forming from shapeless molten glass
3	With coating	46	With blowing to shape glass
4	With joining of fibers or filaments	47	In mold cavity
5	Fiber formation by utilization of fluid blast	48	And bonding to part in same mold cavity
6	During slinging or rotary- centrifugal distribution	49	Bonding to metal formed part
7	Fluid blast comminution of solid filament	50	Forming and bonding glass sheet to metal part
8	By slinging or rotary-centrifugal distribution	51	Contacting metal with molten glass prior to forming sheet
9	With felting means	52	Forming of plural glass sheets
10	With assorting means	53	Forming plural sheets or sheet-like streams from same source
11	Combined		
12	Means for heating or cooling formed filament or fiber	54	With reshaping glass preform prior to assembly or subsequent to bonding
13	From rod stock		
14	By slinger and fluid blast means	55	Prior to assembly
15	By slinger	56	With severing, perforating, or breaking of glass
16	By fluid blast means		
17	PROCESS	57	Relative rotation of work and heating means
18	With shaping of particulate material and subsequent fusing of the particles	58	Of parts having opposed facing areas out of contact, e.g., building blocks
19	Slag utilization		
20	Foaming of slag	59	Of glass to metal part
21	Self supporting particle making (e.g., bead, ball, granule, etc.)	60	With coating
22	With pore forming in situ	61	With wearing away of surface material, e.g., abrading or grinding
23	With destruction or delamination of transitory attached or associated separate material	62	Combined
		63	Sequentially forming, reheating and working
24	Utilizing parting or lubricating layer	64	Reshaping
25	Providing a gaseous layer between glass and apparatus	65	Forming and fire polishing of product
26	Coating of apparatus	66	Forming product or preform from molten glass
27	Repairing or cleaning of apparatus; or batch dust prevention or control	67	Converting sheet to hollow product or hollow product to sheet
28	With glass reclaiming, repairing or crack run interruption	68	Initially forming of hollow product or preform in mold cavity
29	With testing or inspecting	69	With annealing or tempering
30	With chemically reactive treatment of glass preform	70	With severing of formed product
31	By etching or leaching	71	Spreading of molten glass by rotation
32	Operating under inert or reducing conditions	72	With charging of mold cavity
33	Devitrifying or vitrifying crystalline glass	73	By suction from upper surface of "pool"
34	With sealing off of gas evacuating opening	74	With sequential blowing in charged cavity
35	With vibrating, oscillating or agitating a preform	75	Through orifice in bottom wall of dispenser
36	Fusion bonding of glass to a formed part	76	With additional diverse shaping step
37	Lens making	77	With additional forming step
38	With bonding of at least three formed parts	78	Diverse
39	With molding or reshaping of glass to assume shape of con- figured lens part during bonding	79	Press and blow
		80	In separate lines
40	Dielectric or Joule effect heating of work	81	By differential gas pressure
41	With annealing or tempering of glass	82	Reshaping of hot parison in mold cavity to form hollow article
42	Bonding of sub-assembly with subsequent assembly and bonding (formed parts only)	83	With positive cooling of product or molten glass at forming area
		84	By direct gaseous contact
		85	Of glass product

PROCESS		PROCESS	
	Forming product or preform from molten glass	136	Purifying or homogenizing of molten glass
86	Drawing and simultaneously forming	137	Finishing by heating
	hollow stock from molten glass	138	Cooling of molten glass
87	With additional shaping, or severing, or perforating		ELECTRONIC ENVELOPE HEADER, TERMINAL OR STEM MAKING MEANS
88	Vertically drawing upwardly while applying fluid internally of stock	139	With means inserting wire into glass
		140	By press mold
89	Forming hollow stock by surface filming	141	MELT DISINTEGRATOR AND SOLIDIFIER INCLUDING FLUID-MELT CONTACT MEANS
90	Sheet		PARTICULATE BEAD OR BALL MAKING APPARATUS, e. g., PIN HEADING
91	With application of lateral tension to edge portion of moving sheet	142	By rolling means
92	With smoothing subsequent to sheet formation	143	MEANS SHAPING PREFORM FROM GRANULAR MATERIAL WITH FUSION MEANS
93	With reshaping or surface deformation	144	PLURAL SOURCES FEEDING DIVERSE GLASS MELTS TO COMMON FORMING MEANS
94	Subsequent to formation	145	WITH MEANS TO FEED DIVERSE MATERIAL TO GLASS WORKING MEANS
95	With annealing or tempering		Wire laminating means
96	Conveying at different rate than speed of formation	146	Sheet rolling means
97	With severing or perforating	147	Sandwiching wire between opposed glass feeds
98	Simultaneously forming plural separate sheets	148	Roll coacting with platen
99	By or with pouring molten glass onto forming surface	149	Embedding means on roll
100	Onto moving roll or platen	150	FUSION BONDING MEANS
101	Through bite of rolls	151	Concentric body making, e.g., vacuum bottle making, etc.
102	Reshaping or surface deformation of glass preform	152	Glass to metal
103	Utilizing heat shield or heat-sink	153	Electronic device making
104	With annealing, tempering or fire-polishing	154	With article molding means
105	With severing or perforating	155	MEANS PROVIDING SPECIAL ATMOSPHERE WITH SIGNAL, INDICATOR, INSPECTION MEANS, REGISTER, OR RECORDER
106	Reshaping of planar sheet	156	WITH APPARATUS SAFETY MEANS
107	By sagging by gravity on mold surface	157	CONTROL RESPONSIVE TO CONDITION SENSING MEANS
108	Reshaping of tubular preform, retaining cavity	158	Glass working fluid or treating fluid control
109	During rotation	159	Temperature or heater control
110	Utilizing vacuum or gas pressure	160	Speed control
111	Glass preform treating	161	Molten glass dispenser or gatherer control
112	With severing or perforating	162	WITH REJECT CATCHER, DEFLECTOR OR HOLDER
113	By or with flame	163	PERFORATOR FOR ARTICLE OR PREFORM CONVERTIBLE TO DIFFERENT OPERATION
114	Tempering	164	WITH POSITIVE CLEANING MEANS FOR APPARATUS
115	Differential or localized	165	WITH MEANS PROVIDING PARTING MATERIAL
116	Quenching in liquid bath	166	WITH APPARATUS LUBRICATING MEANS
117	Annealing	167	WITH REPAIR, ASSEMBLY OR DIS-ASSEMBLY MEANS FOR APPARATUS
118	During conveying	168	To replace worn or damaged parts
119	Annealing by direct contact with gaseous heat exchange medium	169	To provide alternately used parts
120	By flame	170	WITH MECHANICAL CUTTER, SCORER OR SCRIBER FOR ARTICLE OR PREFORM
121	Blending of separate molten glass streams	171	With annealing means
122	Charging of molten glass into mold cavity	172	Running length
123	By gravity and severing subsequent to charging mold cavity	173	Associated with article mold
124	By suction	174	WITH AGITATOR FOR MOLTEN OR SOFT GLASS
125	Gathering from upper surface of glass pool	175	Delivery area associated
126	Discharging molten glass downwardly through orifice	176	Orifice associated
127	With gob shaping or treating subsequent to discharge through orifice	177	COMBINED
128	With temperature modification at orifice	178	WITH FLUID SUPPORT FOR ARTICLE OR PREFORM
129	Regulating or arresting of flow into or out of orifice	179	EXTRUSION DIE FORMER WITH UPSTREAM DISCHARGE ASSISTANT
130	With or by differential gas pressure	180	
131	With segregation prior to discharge	181	
132	With segregation prior to discharge	182	
133	Severing of molten glass stream	183	
134	Purifying or homogenizing of molten glass		
135	Melting in separate zone of glass container, e.g., tank furnace		

## CLASS 65, GLASS MANUFACTURING

184	MEANS CHARGING CONTINUOUS FILM OR STRIP TO SEPARATE AND DISTINCT FORMER		DIVERSE DISTINCT GLASS WORKING APPARATUS
185	Into sheet rolling means		Press means with blow means
186	With auxiliary heating or cooling means upstream of rolling means	233	With mold inverting means
187	MEANS DRAWING TUBE OR ROD STOCK FROM BATH	234	With pneumatic charge compacting means
188	Drawing vertically upward	235	Settle-blow means
189	With product take-down means	236	Neck mold inverting
190	Means correlating air supply and bait movement	237	With parison mold inverting
191	With internal core or centering means	238	Diverse molds traveling concentric orbits
192	Air injection means extending through bath	239	With diverse motion of mold
193	MEANS DRAWING SHEET FROM BATH	240	With movable work transfer means between orbits
194	With annealing or tempering means	241	Plural traveling mold carriers
195	Means dividing and recombining melt in draw chamber	242	With movable intermediate work transfer means
196	Vertically upwardly with means bending sheet to horizontal	243	Reciprocating mold bottom
197	With moving endless drawing or flattening table	244	PLURAL DISTINCT GLASS WORKING APPARATUS
198	With coating rolls contacting surface of supply bath	245	Spaced preform reheating means with reshaping means
199	With width maintaining and/or lateral stretching means	246	Sheet rolling means
200	Stretching means	247	Plural presses
201	Adjustable width maintaining means	248	Plungers sequentially coating with same mold
202	With pivoted lip tile	249	With relative rotation between plunger and mold during withdrawal
203	With auxiliary heating means for draw pot or drawing chamber	250	Plungers oppositely disposed
204	With cooling means in drawing chamber	251	Plungers oppositely disposed
205	With radiant heat reflector in draw pot or drawing chamber	252	Plungers orbiting above orbiting molds
206	With skimmer	253	Fire-polishing means
207	GOB CHARGING MEANS WITH SHAPE IMPARTING RECEPTACLE MEANS	254	ROLLING MEANS TO FORM SHEET OR STRIP
208	With glass treating means	255	With treating means
209	By fluid pressure discharge assistant means	256	With corrugating or surface imprinting means
210	By suction gatherer mounted above supply	257	Roll coating with planar platen
211	With means correlating movable pool-closure	258	Reciprocating platen
212	Gatherer moving transversely from orbit of traveling mold, i.e., ram type	259	SHEET CASTING AND RECEIVING MEANS
213	Mold is gatherer	260	With pot handling means
214	Parison mold		WITH MEANS ABOVE MOLD TO TAKE-OUT OR TRANSFER PRODUCT
215	With plunger movable relative to mold	261	BLOWING MEANS WITH BLOW MOLD
216	With separate, distinct blow mold	262	With treating means
217	Diverse molds traveling concentric orbits	263	Combined with vacuum means
218	Finish mold pivotally mounted below parison's orbit	264	Traveling mold
219	With blow means	265	With means heating and/or cooling apparatus
220	Sequentially used, distinct molds	266	Mold rotary about own axis
221	By delivery from tank feeder	267	With means heating and/or cooling apparatus
222	To parallel mold tables	268	PREFORM RESHAPING MEANS WITH TREATING MEANS
223	With press means	269	GLASSWORKING OF PREFORM BY OR WITH REHEATING MEANS (e.g., FLAME SEVERING)
224	With diverse molding	270	Envelope tipping off type
225	With gob guide means	271	Heating means movable relative to work during shaping operation
226	With press means	272	Work, workholder or tool correlated burner control
227	DIVERSE DISTINCT GLASS WORKING APPARATUS	273	Planar sheet preform
228	Marvering means with blow means	274	With spaced preheating means
229	Press means with blow means	275	Mechanical means to reshape preform
230	With reheating means therebetween	276	Tubular type preform
231	Blank mold encaseable in finish mold	277	By resizing mandrel
232	With mold inverting means	278	Means supporting and orbiting preform
		279	Preform supported horizontally
		280	Preform supported vertically
		281	By bending means
		282	By internal forming means
		283	By stretching means
		284	Fire-polishing means
		285	To reshape preform by flame pressure or gravity

## CLASS 65, GLASS MANUFACTURING

286	PREFORM RESHAPING MEANS	336	GATHERING OR DRAWING POOL TYPE FURNACE
287	Sheet bending mold	337	Supplemental heating or heat exchange means associated with pool
288	With heat shield or heat sink	338	With deputer, draw ring or draw shield
289	Including auxiliary movable sheet support or movable sheet guide means	339	Separate and distinct means defining pool (e.g., floor supported dam)
290	Movable mold section	340	Movably mounted
291	Having movable section	341	Cascadingly connected
292	Cylindrical preform	342	By bridge
293	By threading means	343	Floating bridge
294	By expansible mandrel	344	W/Deputer, draw ring or draw shield
295	By crimping means	345	By suspended baffle
296	By internal and external forming means	346	GLASS CONDITIONING CHANNEL SECTION
297	Both rotary driven	347	MELTING POT OR FURNACE WITH STRUCTURALLY DEFINED DELIVERY OR FINING ZONE
298	Rotary internal, stationary external	348	PRODUCT COOLING MEANS, e.g., TEMPERING
299	By flaring means	349	With preceding reheater
300	MEANS APPLYING PNEUMATIC PRESSURE INSIDE OF DISCRETE CHARGE, i.e., BLOW MEANS	350	Plural spaced reheaters
301	With selective control means	351	Plural spaced cooling means
302	ARTICLE FORMING MEANS UTILIZING MOLD MOTION, e.g., CENTRIFUGAL CASTING	352	DRAWING BAIT
303	GOB SHAPING OR TREATING MEANS DOWN-STREAM OF GOB SEVERING MEANS	353	With air supply means
304	WITH GOB HANDLING MEANS	354	With heating or cooling means
305	PRESS MOLDING MACHINE	355	MEANS HEATING OR COOLING APPARATUS Internally positioned
306	With product treating means	356	MOLD WITH SEPARATING MEANS OR CLAMPING MEANS
307	Mold ring or baffle laterally and movably supported	357	Core drawing means
308	Plunger coaxing with successively presented molds	358	With mold support or carrier
309	Relative rotation between plunger and orbiting mold	359	Pivoted mold sections
310	Independent dies actuated by common plunger	360	MOLD WITH SUPPORTING OR CARRYING MEANS
311	Means providing orbiting mold with diverse motion	361	PLUNGER
312	Mold orbiting about horizontal axis	362	MOLD -- FEMALE
313	Vertically segmented orbiting mold	363	With chill, non-conductor, or expansion compensator
314	Plural motors coaxial with plunger	364	With means to make surface impressions
315	With core drawing means	365	With auxiliary port (e.g., sprue or vent)
316	With means to rotate plunger during withdrawal	366	With core
317	Means reciprocating or oscillating female mold member	367	Segmented
318	With means varying plunger pressure during pressing	368	Separable body and neck
319	With means for heating or cooling apparatus	369	And divided perpendicularly with respect to mold bottom
320	Selectively operated plural plungers	370	Perpendicularly with respect to mold bottom
321	Plunger penetrating superimposed mold table	371	Particular material or linings
322	With means to adjust plunger stroke	372	CORE
323	PRODUCT OR PARISON CENTERING MEANS, OR MOLD AND/OR CORE ALIGNING MEANS	373	APPARATUS MADE OF SPECIAL MATERIAL
324	MOLTEN GLASS DISPENSING MEANS (e.g., FEEDER OR LADLE)	374	MISCELLANEOUS
325	Discharge orifice below melt level	375	
326	With auxiliary heating or cooling means		
327	At orifice		
328	Plural plunger-type discharge assistants or discharge orifices		
329	By differential gas pressure		
330	By reciprocating plunger-type discharge assistant		
331	Wit. diverse motion		
332	With severing means		
333	Discharge lip with discharge assistant		
334	WITH MOLTEN GLASS CHARGE CUTTING OR SCRAPING MEANS		
335	GLASS FURNACE WITH FURNACE CHARGING MEANS		

172-0(a)

Class 172, Earth Working  
INDEX TO SUBCLASSES  
(List of first line subclasses with brief notes.  
See schedule and definitions for details.)

January 1959

- |   |  |
|---|--|
| <p>1 PROCESSES<br/>See Class 47, Plant Husbandry, subclass 58 for earth working processes with earth treatment</p> <p>2 AUTOMATIC POWER CONTROL<br/>Includes 3-point hitch where claims are specific to automatic draft response by power lift</p> <p>13 LAWN EDGER<br/>Means for cutting groove in lawn next to sidewalk</p> <p>19 SOD CUTTER<br/>Means specialized to cutting and lifting turf</p> <p>21 EARTH PERFORATOR (e.g., LAWN AERATOR)<br/>Means for making a multiplicity of small vertical holes in the earth</p> <p>23 DRIVEN FROM OR GUIDED BY STATIONARY OBJECT, OR ANCHORED<br/>For example, means hooked around a tree or pulled by a cable attached to a winch</p> <p>27 WITH MEANS FOR CUTTING OR SHREDDING PLANTS WITHOUT SOIL DISTURBANCE<br/>Combined with a device classifiable in Class 56, Harvesters</p> <p>29 WITH MEANS FOR SHIFTING SURFACE MATERIAL WITHOUT SOIL DISTURBANCE<br/>Combined with a rake or brush</p> <p>32 WITH SEPARATING AFTER EARTH WORKING<br/>Earth separated according to size of granules</p> <p>33 WITH POWER DRIVEN MOLDBOARD, CONVEYER OR HANDLER<br/>Power means handling earth after plow lifts it from ground</p> <p>34 COMPLETE APPARATUS ADAPTED FOR USE UPSIDE DOWN<br/>Earth worked right side up or upside down</p> <p>35 WITH DRIVE MEANS FOR TOOL OR CLEANER<br/>Means moves tool to work earth in addition to means for traversing it over the ground</p> <p>126 WITH EARTH MARKER<br/>Earth marker intended to be used as an auxiliary to another apparatus</p> <p>133 DIVERSE TOOLS<br/>Includes tools of different sizes but not rights and lefts</p> <p>204 ALTERNATING FOR RIGHT OR LEFT HAND OPERATION<br/>Plow throws earth the same way on each traverse</p> <p>233 WITH OBSTRUCTION FEELER FOR MOVING OR RELEASING IMPLEMENT TO AVOID OBSTRUCTION (INCLUDES DAM FORMER)<br/>Includes means to avoid hitting a tree. In case of dam former a feeler feels accumulation of earth and permits or causes movement of tool</p> <p>236 GROUND ENGAGEABLE DRAFT RESPONSIVE LEVER<br/>End of a stick digs into ground and lifts implement as it moves over ground</p> <p>238 GROUND SUPPORT MOVED VERTICALLY RELATIVE TO FRAME BY DRAFT FORCE<br/>Wheel moved down relative to frame by draft force</p> <p>239 DRAFT, PITCH OR GROUND LEVEL RESPONSIVE DEPTH CONTROL<br/>Depth control by non-automatic means such as linkages</p> <p>240 WITH GROUND SUPPORT ENGAGEABLE WITH GROUND FOR TRANSPORT ONLY<br/>Implement transport wheel, not useable as gauge wheel</p> <p>245 CONVERTIBLE; OR CHANGEABLE BY DIS-ASSEMBLY OR ASSEMBLY</p> <p>255 TURN LIFTS TOOL OFF OR LOWERS TOOL INTO GROUND</p> | <p>256 PROPULSION UNIT GUIDED BY WALKING ATTENDANT OR PART OF ARTICULATED VEHICLE<br/>Small tractor with walking attendant or riding attachment</p> <p>261 OVERLOAD SHIFTING<br/>Shifting only on a true overload, not a mere yielding on increased load</p> <p>272 WITH MEANS TO FACILITATE MOUNTING OF IMPLEMENT ON MOTOR VEHICLE<br/>Quick hitch devices. See also Class 280, Land Vehicles</p> <p>276 TOOL AHEAD OF MOTOR VEHICLE<br/>Tool all the way ahead; may clear path for tractor wheel</p> <p>278 WITH WHEEL STEERING OR ACTUATOR FOR HORIZONTALLY ANGLING WHEEL AXIS<br/>Steering details; turning wheels of a trailing implement or adjusting horizontal angularity of wheel axis</p> <p>292 SPECIFIC PROPELLING MEANS<br/>Significant details of tractor drive. Includes tractor tracks</p> <p>293 SERIES OF LIKE ELEMENTS SEQUENTIALLY OPERATED BY POWER CYCLE<br/>Tools sequentially power lifted at end of field</p> <p>297 TOOL FORWARD OF REAR OF MOTOR VEHICLE<br/>For example, cultivator tools mounted on tractor</p> <p>310 PLURAL, WHEELED IMPLEMENTS<br/>Implements, each with its own wheel</p> <p>315 ACTUATOR ON TRAILING IMPLEMENT, CONTROLLED FROM PROPELLING VEHICLE<br/>For example, power lift on trailing implement and significantly claimed detail of control from tractor</p> <p>317 ACTUATOR ON VEHICLE FOR RELATIVELY MOVING PARTS OF TRAILING IMPLEMENT<br/>For example, power unit on tractor angles gangs of trailing disk harrow</p> <p>321 ACTUATOR ON VEHICLE FOR MOVING WHEELED IMPLEMENT<br/>For example, power unit on tractor lifts trailer off ground</p> <p>322 WITH ACTUATOR FOR ROCKING TOOL ABOUT WHEEL AXIS<br/>Tool stays at fixed radius from wheel axis when manipulated</p> <p>324 WITH ACTUATOR ON TRAILING GROUND SUPPORTED FRAME FOR MOVING DRAFT MEANS Laterally or vertically<br/>Means on trailer for moving draft tongue</p> <p>329 GUIDED BY WALKING ATTENDANT; SUPPORTED, PROPELLED OR HELD IN POSITION BY ATTENDANT<br/>Hoes, hand pushed tool with wheels, or attendant rides on implement and manipulates cultivator tools</p> <p>382 MULTIPLE LEVEL TOOLS<br/>Tools work at different ground levels</p> <p>383 AXIS OF ROTATION OF WHEEL LOCKABLE OR ANGULARLY ADJUSTABLE<br/>Caster wheel which is locked in position at times, or wheel axis adjustable in vertical transverse plane</p> <p>387 WITH WHEEL SUBSTITUTE (e.g., RUNNER)<br/>Implements with runners, like sleds. Not land-sides or runners which are parts of plows</p> <p>395 WITH GROUND SUPPORT VERTICALLY ADJUSTABLE RELATIVE TO FRAME<br/>Wheel vertically adjustable for transport or gauging purposes</p> <p>430 WITH INDICATING OR SIGHTING MEANS<br/>Means other than earth markers</p> |
|---|--|

January 1959

## Class 172, Earth Working

## INDEX TO SUBCLASSES

172-0(b)

(List of first line subclasses with brief notes.  
See schedule and definitions for details.)

- 
- 431 WITH SEAT OR ATTENDANT'S STATION  
Significantly claimed seat detail
- 437 WITH TOOL SHARPENER
- 438 COMBINED
- 439 MAST TYPE HITCH (e.g., THREE POINT HITCH)  
For example, three point hitch with no significant detail in claim to automatic feature
- 452 WITH ACTUATOR ADAPTED TO LIFT IMPLEMENT FOR TRANSPORT ON WHEELED FRAME OR BROADLY CLAIMED IMPLEMENT  
For example, implement lifts on tractors
- 507 GROUND SUPPORT MOVABLE HORIZONTALLY  
Wheel adjustable laterally
- 508 WITH GUARD, SHIELD OR PLANT DIVERTER  
Shields for dirt or to prevent injury. Deflectors for plants
- 518 ROLLING, ROTATING OR ORBITALLY MOVING TOOL  
For example, disks or blade type tools, no driving means being claimed
- 605 SHIFTABLE HITCH MOVES TOOL RELATIVE TO FRAME  
Draft force moves hitch thereby shifting tool
- 606 WITH CLEANER  
For disk cleaners see subclass 558+
- 611 WITH WEIGHT
- 612 FABRIC OR FLEXIBLE TOOL  
The earth working means is like a mat or piece of chain armor
- 613 PLURAL, RELATIVELY MOVABLE TOOLS  
Tools may move relative to each other during operation or by adjustment. Many harrows in this group
- 663 WITH ACTUATOR  
Residual group for actuators not classified in subclasses above
- 669 WITH WHEEL; OR SUPPORTED ON WHEEL FRAME OR BROADLY CLAIMED IMPLEMENT  
Wheel attachment for tool, or tractor or trailer frame and tool supported thereby
- 677 WITH DRAFT DETAIL  
Implements with details of draft means. See Class 280, Land Vehicles, for hitches for vehicles or broadly claimed implement
- 681 TOOL, STANDARD OR CONNECTION  
Multiple or single plows, cultivators, harrows, etc., and subcombinations peculiar thereto. See Class 306, Tool-Handle Fastenings, subclass 1.5+ for beam to standard and standard to shovel joints.
- 776 MISCELLANEOUS (e.g., FRAMES)

Original Classification Classification Division IV Definitions in Bulletin No. 425		1958	WITH DRIVE MEANS FOR TOOL OR CLEANER
1	PROCESSES		Plural driven tools
2	AUTOMATIC POWER CONTROL		Plural groups of disks
3	Motive power control	55	Staggered tools
4	Constant depth type	56	Laterally spaced tools
5	Obstruction sensing type (includes plant sensing)	57	Longitudinal axes
6	Electrical	58	Vertical axes
7	Draft responsive	59	Transverse axes
8	Variable rate responsive	60	Intermittent drive for tool
9	With position control	61	With spring return
10	Sensitivity adjustment	62	With non-driven tool (e.g., plow, harrow, drag, scraper, knife or roll)
11	With excess draft release	63	Non-driven furrow opener and driven dam former
12	Overload lift type	64	Interdigitating non-driven and driven tools
13	LAWN EDGER	65	Cooperating driven cleaner or comminutor and contiguous tool
14	With or convertible to non-earth working implement	66	Driven comminutor at outlet of earth guide
15	Rolling or driven cutter	67	Rolling tool
16	With fixed cutter or furrower	68	With tool drive from rolling tool
17	With wheel or roller	69	Fore-and-aft non-driven tool
18	Impact or grapple	70	Non-driven tool follows path of driven tool
19	SOD CUTTER	71	Leveling drag or furrow shaper
20	With means for vertical transverse cutting while moving	72	Staggered driven and non-driven tool (e.g., cotton chopper)
21	EARTH PERFORATOR (e.g., LAWN AERATOR)	73	With power take-off from tool drive to adjust tool
22	Earth removing	74	Interconnected tool lift and drive control
23	DRIVEN FROM OR GUIDED BY STATIONARY OBJECT, OR ANCHORED	75	Implement with ground support and articulated connection to vehicle
24	Around tree or stake	76	Vertically biased implement
25	Rotatable about vertical axis	77	Vertically adjustable ground support
26	Guided by surface track or previously formed furrow	78	Tool driven from prime mover on vehicle
27	WITH MEANS FOR CUTTING OR SHREDDING PLANTS WITHOUT SOIL DISTURBANCE	79	With wheel substitute (e.g., runner)
28	Driven	80	With plant deflector or protector
29	WITH MEANS FOR SHIFTING SURFACE MATERIAL WITHOUT SOIL DISTURBANCE	81	Driven tool selectively sniftable along line of travel
30	Driven shifting means	82	Tool drive interrupted by shifting tool
31	Combined with rolling or vertically acting transverse cutter	83	Simultaneously reciprocating and oscillating blade having elongated shank
32	WITH SEPARATING AFTER EARTH WORKING	84	Transverse chopping type
33	WITH POWER DRIVEN MOLDBOARD, CONVEYER OR HANDLER	85	With plural cranks or cams driving each blade
34	COMPLETE APPARATUS ADAPTED FOR USE UPSIDE DOWN	86	Means for varying contour of path of blade
35	WITH DRIVE MEANS FOR TOOL OR CLEANER	87	With plural cranks or cams driving each blade
36	Subsurface shears or nippers	88	Means for varying contour of path of blade
37	Tool rotated by attendant	89	Irregular or off center ground engaging wheel or support
38	With obstruction feeling device for moving or releasing implement	90	Blade movable with respect to cyclically driven carrier
39	With cleaner or comminutor spaced from ground surface	91	With means for moving blade
40	Vibrating tool	92	Rectilinearly reciprocating blade
41	Attendant supported tool	93	Blade oscillating arcuately or swivelly with respect to rotary carrier
42	Guided by walking attendant	94	By cam or crank
43	With ground support vertically adjustable relative to frame	95	Blade flexible or with yieldable mount on carrier
44	Subsurface shaft or bar (e.g., rod weeder)	96	Compound motion for tool
45	Flails	97	Tool mounted for lateral shifting
46	Coaxial tools oppositely rotated	98	About generally vertical axis
47	With mast type hitch (e.g., three point hitch)	99	Blade on endless driven belt or chain
48	Plural driven tools	100	Tool guided for rectilinear reciprocation
49	Contiguous cooperating or intermeshing rotary ground engaging tools	101	Tool moves in horizontal, transverse path
50	Diverse tools	102	With overload relief or clutch in drive train (e.g., overload release)
51	All rotary	103	Unidirectional clutch in drive from ground wheel
52	Parallel axes	104	Driven from rolling or driven ground wheel
53	Rectilinearly reciprocating tool	105	Belt or chain drive
54	Oscillating tool	106	Tool driven about horizontal, longitudinal axis
		107	

WITH DRIVE MEANS FOR TOOL OR CLEANER		DIVERSE TOOLS	
108	Tool driven about horizontal, longitudinal axis	164	Jointer and plow
109	Rotary driven tool	165	Rolling jointer
110	Adjustable tooth or blade	166	Including colter
111	Tool driven about generally vertical axis	167	Rolling colter
112	(e.g., oscillating choppers)	168	Fixed point or share with rotary moldboard
113	Rotary driven tool	169	Rotating tool with fixed moldboard
114	With deflector or shield for thrown material	170	Including tool rotatable about vertical axis
115	Laterally directed outlet flow	171	Including smooth leveling roller
116	Specific propelling means	172	Spaced from moldboard side of plow
117	Tool steers implement	173	With diverse rolling tool
118	Tool propels implement	174	With teeth
119	Tool freely or yieldably mounted on chassis	175	Rolling and non-rolling
120	Tool driven about axis transverse to draft line	176	Following same path
121	Screw or spiral rib, blade or tooth row	177	Furrowing or ridging implement followed by furrow or ridge roller
122	Disk or planar cutter (e.g., saw)	178	Rolling tool has circumferentially spaced blades, tines or the like
123	Laterally extending bar or blade with skeleton support (e.g., lawn mower type)	179	Including disk gang
124	Drum with teeth or blades	180	Non-rolling tool group with laterally coextensive rolling tool
125	Rotary driven tool	181	Rolling precedes non-rolling (same path)
126	Tool driven about diagonal axis	182	Concave furrowing disk with trailing tool
127	Tool drive details	183	Laterally spaced
128	WITH EARTH MARKER	184	With scissors or shearing action between adjacent faces
129	Marker shiftable on turning	185	Diverse rolling
130	Marker adjusted upon raising implement	186	Spaced on same axis of rotation
131	Ground wheel operated marker control	187	Plane and dished disks
132	Multiple interconnected markers	188	Differing in size
133	Markers on laterally shiftable member	189	Runner attached
134	Marker swingable about longitudinal axis to both sides	190	Including fabric or flexible tool
135	DIVERSE TOOLS	191	Including vertical longitudinal blade (e.g., stabilizer)
136	One located in path of implement wheel	192	Plural
137	One implement surrounds another	193	Including horizontal knife or cutter
138	Tools usable alternately only	194	First tool with spaced trailing sweep
139	With means to vary spacing of tools upon turning	195	Sweep adjustable
140	With interconnected vertical adjustment	196	Second implement follows path of first
141	Plow and colter	197	Including subsoiler
142	With independent means for vertical movement	198	Teeth and scraper, leveler or drag
143	Interconnected adjustment of horizontal angle of rolling and position of diverse tool	199	Including teeth
144	Including spring formed tool or standard	200	Including drag, scraper or leveling blade
145	Including intermittently rolling tool	201	Diverse implement precedes scraper or leveler
146	Colter, jointer and plow	202	Laterally spaced
147	Three or more diverse implements following same path (A,B,C or A,B,A)	203	Spaced from moldboard side of plow
148	Four or more	204	Connected to moldboard or handle
149	Alternately diverse (A,B,A,B)	205	ALTERNATING FOR RIGHT OR LEFT HAND OPERATION
150	Longitudinally spaced like implements with intermediate diverse implement (A,B,A)	206	Draft revolvable on transverse axis
151	Including rolling tool	207	Interrelated tool shift and lateral movement of draft member
152	Smooth leveling roller	208	Draft member reversed
153	Diverse rolling	209	Draft member latch control
154	At least four alternately diverse laterally spaced tools (A,B,A,B)	210	Interrelated tool lift and shift
155	Alternate rolling and non-rolling	211	Mast type hitch
156	All rolling	212	Lift by ground support manipulation
157	Laterally spaced like tools with intermediate diverse tool (A,B,A)	213	Interrelated tool shift and ground support manipulation
158	Spaced rolling with intermediate non-rolling	214	Tools oriented for movement in opposite directions
159	Spaced non-rolling with intermediate rolling	215	Wheeled frame with reversible draft member
160	All rolling	216	Tilting beam
161	Spaced right and left hand tools with intermediate symmetrical tool	217	Pivoted about spaced transverse axes, or translated
162	Including spike tooth	218	With movable deflector
163	Including implement alternating for right or left hand operation	219	Shiftable moldboard
	Reversal of implement adjusts diverse tool	220	Tool shifted for opposite throw
	Jointer and plow		Reversible disk with reversible cleaner

ALTERNATING FOR RIGHT OR LEFT HAND OPERATION		272	WITH MEANS TO FACILITATE MOUNTING OF IMPLEMENT ON MOTOR VEHICLE
221	Tool shifted for opposite throw	273	Tool forward of rear of motor vehicle
	Plural tools shifted about individual vertical axes	274	Implement has ground support
222	With translational movement of axes	275	Self-coupling by horizontal movement
223	Moldboard type shiftable about longitudinal axis	276	TOOL AHEAD OF MOTOR VEHICLE
224	Axially rotatable implement	277	With ground support
225	With actuator	278	WITH WHEEL STEERING OR ACTUATOR FOR HORIZONTALLY ANGLING WHEEL AXIS
226	Gearing	279	Implement part interconnected with motor vehicle steering means
227	Chain or cable	280	Implement wheel steered
228	Parallel separate tools	281	Transverse tool bar laterally shiftable
229	Interconnected for simultaneous raising and lowering	282	Wheel on trailing implement responds to turning movement
230	Independently operable	283	Interconnected with adjustable tool
231	Power derived from ground wheel	284	With additional angular adjustment of wheel
232	Oblique axis in longitudinal vertical plane	285	Rear wheel turned or controlled
233	WITH OBSTRUCTION FEELER FOR MOVING OR RELEASING IMPLEMENT TO AVOID OBSTRUCTION (INCLUDES DAM FORMER)	286	Wheel on non-self-propelled device
234	Relatively movable	287	Wheel interconnected with tool
235	Latch releasing	288	Plural interconnected relatively movable wheels
236	GROUND ENGAGEABLE DRAFT RESPONSIVE LEVER	289	Transversely aligned stub shafts
237	Roll over type implement	290	Swinging axle
238	GROUND SUPPORT MOVED VERTICALLY RELATIVE TO FRAME BY DRAFT FORCE	291	Wheel behind tool
239	DRAFT, PITCH OR GROUND LEVEL RESPONSIVE DEPTH CONTROL	292	SPECIFIC PROPELLING MEANS
240	WITH GROUND SUPPORT ENGAGEABLE WITH GROUND FOR TRANSPORT ONLY	293	SERIES OF LIKE ELEMENTS SEQUENTIALLY OPERATED BY POWER CYCLE
241	Apparatus inverted to engage ground support with ground	294	Sequentially operated servo-motors
242	Implement tiltable on longitudinal axis	295	Tool forward of rear of motor vehicle
243	Tool changeable to or replaced by ground support	296	Shaft with spirally arranged projections
244	Tool and ground support moved together relative to frame	297	TOOL FORWARD OF REAR OF MOTOR VEHICLE
245	CONVERTIBLE; OR CHANGEABLE BY DISASSEMBLY OR ASSEMBLY	298	With ground support
246	To land vehicle with body	299	Power actuator with cut-out or lock-out means
247	To device classifiable in another class	300	With rearwardly mounted tool
248	To different type of hitch	301	Tools actuated by independent power units
249	Plural simultaneously useable tools to single tool	302	Front and rear independent
250	Changeable by disassembly or assembly	303	Power actuator with manual adjusting or supplemental manual actuating means
251	Tool changeable to diverse tool	304	Tools independently actuatable
252	Tool plus added part forms diverse tool	305	With means for moving tool laterally
253	Tool added or subtracted	306	Connected to front axle
254	Tool rearranged	307	Parallelogram type lift
255	TURN LIFTS TOOL OFF OR LOWERS TOOL INTO GROUND	308	With push bar
256	PROPULSION UNIT GUIDED BY WALKING ATTENDANT OR PART OF ARTICULATED VEHICLE	309	Pivoted on horizontal diagonal axis
257	Riding attendant	310	PLURAL WHEELED IMPLEMENTS
258	Endless track or single driven wheel	311	Outrigged implement adjustable inwardly
259	With vertically adjustable wheel	312	Implement draft connection forwardly of rear of self-propelled vehicle
260	With actuator for moving earth working element vertically	313	Laterally spaced with separate draft tongues
261	OVERLOAD SHIFTING	314	Implements in echelon (e.g., gang plows)
262	Alternate tool brought into operation upon shift	315	ACTUATOR ON TRAILING IMPLEMENT, CONTROLLED FROM PROPELLING VEHICLE
263	Actuator released	316	Servo-motor on implement
264	Against spring return device	317	ACTUATOR ON VEHICLE FOR RELATIVELY MOVING PARTS OF TRAILING IMPLEMENT
265	Swinging about fixed pivot axis	318	Actuator on vehicle moves implement ground support vertically relative to implement frame
266	Including toggle linkage	319	Interconnected means for moving hitch
267	Toggle adjustable	320	Disk gang angling
268	Toggle links at acute angle	321	ACTUATOR ON VEHICLE FOR MOVING WHEELED IMPLEMENT
269	Resilient latch	322	WITH ACTUATOR FOR ROCKING TOOL ABOUT WHEEL AXIS
270	Friction lock	323	Unstable wheeled frame moved by actuator
271	Frangible lock (e.g., snear pin)		

324	WITH ACTUATOR ON TRAILING GROUND SUPPORTED FRAME FOR MOVING DRAFT MEANS Laterally OR VERTICALLY		GUIDED BY WALKING ATTENDANT; SUPPORTED, PROPELLED, OR HELD IN POSITION BY ATTENDANT
325	Tool rigidly connected to tongue		Hand tool
326	Vertically	377	Channel type
327	With vertically adjustable ground support	378	Plural prongs, teeth or serrations
328	Interconnected means for adjusting draft means and ground support	379	Plural rows
		380	Made from sheet material
		381	Non-planar earth working portion
329	GUIDED BY WALKING ATTENDANT; SUPPORTED, PROPELLED, OR HELD IN POSITION BY ATTENDANT	382	MULTIPLE LEVEL TOOLS
330	With seat for moving hitch	383	AXIS OF ROTATION OF WHEEL LOCKABLE OR ANGULARLY ADJUSTABLE
331	Hitch guided relative to supporting frame	384	With actuator for tilting in a vertical plane
332	Tool manipulated with respect to mounting frame	385	Adjustable stop
333	Arched wheel frame (i. e., straddle row)	386	Lockable against free swinging
334	Seat counterbalanced beam	387	WITH WHEEL SUBSTITUTE (e. g., RUNNER)
335	With spring biasing means	388	With wheel
336	Spring biased upwardly during operation	389	Spring tooth implement
337	Combined implement lift and wheel adjustment	390	Parallel pivoted tooth bars
338	Tongueless, animal draft	391	Spike tooth implement
339	With balancing means	392	Plural runner supported implements relatively movable during operation
340	Multiple plant row type	393	Spaced parallel runners with tool mounted therebetween
341	With added intermediate tool	394	Disk type tool
342	Cross connected drag bars	395	WITH GROUND SUPPORT VERTICALLY ADJUSTABLE RELATIVE TO FRAME
343	Foot operated	396	Vertically adjustable or selectively lockable hitch
344	With support bracket for transport	397	Tool and ground support moved together relative to frame
345	Manipulated about longitudinal axis	398	Linkage to tool
346	Plural tools independently or oppositely manipulable	399	With power take-off from plural wheels
347	Spring biased	400	Actuator and interconnected means for adjusting wheels on different axles
348	Vertically manipulated		
349	Rolling tool	401	Three or more adjustable wheels on different axles interconnected
350	Handle swingably mounted on axis of tool	402	With power take-off from self- adjusted wheel
351	Guided or propelled by walking attendant and with ground support or draft means	403	With power take-off from wheel
352	With stepper propulsion means	404	Wheel adjusted by own power
353	With body harness or engaging means	405	One wheel translates another swings
354	With wheel	406	With additional actuator changing relative position of wheels
355	Alternately usable tools rocked about wheel axis	407	Power operated adjustment
356	Plural longitudinally spaced wheels	408	Wheel actuates its crank axle mount
357	Handle forward of tool	409	Wheel lockable to crank axle arm
358	Tool forward of wheel	410	Intermittently rotatable member swingable with crank
359	Tool and handle relatively vertically adjustable	411	"Constant neight" depth adjustment
360	With wheel substitute (e. g., runner)	412	Swingable thrust arm engageable with wheel
361	Handle connected to tool or runner	413	Servo-motor adjusting means
362	Tool standard connected to handle	414	Flexible or lost motion connection to actuator
363	Plural handles associated with relatively adjustable tools	415	Translating motion
364	Handle mounted tool adjusting, latching or locking mechanism	416	One ground support translates and another swings
365	Tool and handle relatively adjustable	417	Parallel links
366	Vertically	418	With actuator
367	Multiple handles connected to multiple longitudinal tool carrying beams	419	Screw jack type
368	Plural handles connected to opposite sides of longitudinal beam	420	Rack and pinion or ratchet type
369	With brace member	421	Plural ground supports vertically adjustable relative to each other and the frame
370	With attendant attaching means	422	Crank axle with angularly spaced wheel carrying arms
371	Hand tool	423	With actuator
372	Adjustable	424	Spring assisted
373	Plural tools relatively adjustable	425	Gearing
374	At least one tool immovably secured to handle	426	Worm gear
375	Alternately usable diverse tools or parts		
376	Loop type		

WITH GROUND SUPPORT VERTICALLY ADJUST- ABLE RELATIVE TO FRAME		WITH ACTUATOR ADAPTED TO LIFT TOOL FOR TRANSPORT ON WHEELED FRAME OR BROADLY CLAIMED IMPLEMENT	
	With actuator		
	Gearing		
427	Screw jack type	472	Plural tools simultaneously raised, individually lowered
428	Rack and pinion or ratchet type		
429	Manually operated lever rigid with crank axle	473	Tool differentially or sequentially lifted at longitudinally spaced points
430	WITH INDICATING OR SIGHTING MEANS	474	Tool rocked about independently vertically adjustable transverse axis
431	WITH SEAT OR ATTENDANT'S STATION		
432	Plural	475	Plural longitudinally spaced actuators
433	Riding attachment	476	With lateral adjustment
434	Movable to non-use position	477	Tool adjustable about vertical axis
435	Operator changes position or seat adjustable	478	Tool and lift actuator on opposite sides of transverse pivot axis
436	Mounted on transverse member connecting plural implements	479	Tool lifted forward of transverse pivot axis
437	WITH TOOL SHARPENER	480	Tool swung about freely shiftable or delayed pivot
438	COMBINED		
439	MAST TYPE HITCH (e.g., THREE POINT HITCH)	481	With separate latch
440	Angled gangs liftable as a unit	482	Tool swings about rock shaft axis
441	Tandem gangs	483	Translatable tool
442	With actuator for angling groups relatively	484	By parallel links
443	Struts on trailer or between implement parts	485	Power actuator with manual adjusting or supplemental manual actuating means
444	Hitch quadrilateral modified during lift	486	Manual actuation coextensive with power
445	With means operated by vertical hitch movement	487	Constant height depth adjustment
446	Laterally adjustable tool	488	Single lift actuator for plural relatively movable tools
447	Rockable about vertical axis	489	Tools relatively moved during lift
448	With auxiliary vertical adjustment	490	Rotary drum actuator
449	Tool movable relative to mast while earth working	491	Servo-motor actuator
450	Sway limiting means or swayable tool	492	With power take-off for actuator
451	With tools beyond lateral sides of hitch	493	Position controlled power disengagement
452	WITH ACTUATOR ADAPTED TO LIFT TOOL FOR TRANSPORT ON WHEELED FRAME OR BROADLY CLAIMED IMPLEMENT	494	Overcenter or toggle holding means
453	Actuator electrically powered	495	Foot operated actuator
454	Angled gangs lifted as a unit	496	With combined or optional hand actuation
455	Tandem gangs	497	Tool spring biased during operation
456	Central group liftable vertically, side groups movable inwardly	498	Biased to neutral position
457	With means to restrain lateral sway when raised	499	Spring means alternately biases tool in opposite directions
458	Vertical movement interrelated with another	500	Tool spring pressed downwardly
459	Pivotable about longitudinal axis (e.g., lateral leveling)	501	Lost motion connection between actuator and tool
460	Tool independently vertically adjustable at transversely spaced points	502	Flexible connector
461	Tool lifted with respect to stationary or relatively movable cleaner	503	Actuator slidably connected to tool
462	Plural tools, individually spring biased down, lifted as unit	504	Screw actuator
463	Lift actuator moves with tool or forms removable unit therewith	505	Tool connected to frame by bail
464	Servo-motor forces tool down	506	Spring assisted or spring actuator
465	Servo-motor with follow-up control (e.g., motion responsive position control)	507	GROUND SUPPORT MOVABLE HORIZONTALLY
466	Tool held raised for relieving load on servo-motor	508	WITH GUARD, SHIELD OR PLANT DIVERTER
467	With shiftable hitch causing vertical movement	509	Fender for deflected earth
468	Plural tools, independently actuatable	510	Rotary
469	By single selectively connectable actuator	511	Perforated or screening type
470	With separate actuator for concurrent lift or with interlock	512	Inverted U-shape
471	Three or more independent actuators	513	Laterally spaced (i.e., straddle row type)
		514	Weed turner or trash holddown
		515	Spring biased or spring formed
		516	Plural cooperating elements
		517	Plant deflector
		518	ROLLING, ROTATING OR ORBITALLY MOVING TOOL
		519	Yieldable material rim (e.g., rubber)
		520	Tools on different axes in mutual driving relationship
		521	With power take-off from tool or wheel
		522	Axis substantially vertical
		523	With vertically extending teeth
		524	Positioning means engaging circumference
		525	With weight
		526	Plural tools
		527	Axis substantially longitudinal

ROLLING, ROTATING OR ORBITALLY MOVING TOOL		ROLLING, ROTATING OR ORBITALLY MOVING TOOL	
528	With means for stopping or retarding rotation	580	Plural groups of disks
529	Positive stop	581	Power operated actuator
530	Wheel or motor controlled	581	Groups changeable to different types of arrangements
531	Wobble discs	582	With independent lateral adjustment
532	Screw or spiral	583	Vertically adjustable group
533	Clutch between shaft and rotating element	584	Horizontally angularly adjustable group
534	Wheel or roller with peripherally spaced plant saving means	585	Groups of unequal length
535	Detachable rim for disk	586	More than two laterally positioned groups
536	Wheel, roller or gauge and axially adjacent tool on same axis	587	Groups laterally spaced and unaligned
537	Corrugated surface rollers	588	Hitch longitudinally movable on tongue and groups abreast
538	Paired press rims (e.g., planter press wheels)	589	Turning connection offset from draft connection
539	Smooth roller with groove, rim or disk	590	Latch responsive to tractor motion
540	Tool has circumferentially spaced teeth, tines, blades or the like	591	With manual actuator
541	With means for preventing ground engagement of teeth or blades	592	Concentric controls
542	Tooth or blade on endless carrier	593	Separate handles for independent gang adjustment
543	Spring tooth or blade	594	Double tandem groups
544	Spring moving or mounting means for tooth or blade	595	Double tandem groups
545	Blades or teeth change position relative to each other or rotating support during rotation	596	Tandem groups
546	With means for causing movement	597	Toggle joint between groups
547	With cleaning means	598	Thrust means directly between group axles
548	Tooth or blade units on single axle	599	Disk gang
549	Tooth or blade units angularly adjustable on axle	600	Supported for tilting and horizontal angling adjustment
550	Tooth or blade adjustable on carrier	601	Disks rotatable relative to axle
551	Rolling tool spring biased into ground contact	602	Single disk freely swayable
552	Laterally extending bar or blade with skeleton support (e.g., lawn mower type)	603	Disk horizontally angularly changeable
553	Toothed bar or blade	604	Detailed disk structure per se
554	Drum with axially spaced teeth or blades	605	SHIFTABLE HITCH MOVES TOOL RELATIVE TO FRAME
555	Integral disk	606	WITH CLEANER
556	Tooth or blade axially clamped to hub face (e.g., hoe wheel type)	607	Cleaner surrounds tooth
557	Rim with spokes	608	Clearing roller
558	With disk cleaning means	609	For plural tools
559	Rotatably mounted cleaning means	610	Scraper
560	Cleaner for pair of converging disks	611	WITH WEIGHT
561	Cleaners for opposite sides of disk	612	FABRIC OR FLEXIBLE TOOL
562	Plural cleaners for single disk	613	PLURAL RELATIVELY MOVABLE TOOLS
563	Cleaners with common operator	614	Tool pivots on pivoted member when member moves
564	Mounted on rock shaft	615	Tools connected to parallel pivoted bars
565	Operating means moves parallel to disk gang axis	616	Bars pivoted about vertical axis
566	Spring biased toward disk	617	Also pivoted about horizontal axis
567	Disk gang and single disk on diverse axes	618	Tools assume different angularity for opposite draft
568	Disk gang with movable or removable section	619	Plural tool groups relatively vertically movable during operation
569	Disks pivoted on vertical axes with interconnected means for moving them identically	620	Parallel transverse tooth bars
570	With spring means other than for detent	621	Spring biased bars
571	Spring is for tool group horizontal angling	622	With actuator to vary inclination of teeth
572	Spring acts to move tool vertically	623	Groups abreast and in tandem
573	Plural tools, individually spring urged	624	Plural groups movably connected to forward transverse draft bar
574	Plural disks with individual mount or axis	625	With alternate draft means (spaced 90°)
575	Touching disks	626	Sectional draft bar
576	With interconnected means for adjusting a plurality of disks	627	Groups also connected to one another
577	Reversible group	628	Similar groups arranged to form a triangular shape
578	With wheel (not on motor vehicle)	629	Three or more laterally spaced groups
579	Plural groups of disks	630	Groups pivoted to opposite sides of longitudinal draft member
		631	Group movable about common longitudinal axis
		632	Group movable about oblique horizontal axis
		633	Group pivotal about intermediate transverse axis

PLURAL RELATIVELY MOVABLE TOOLS		TOOL, STANDARD OR CONNECTION	
634	Parallel, pivotally adjusted tool bars	689	Plural tools
635	With actuator	690	Closed geometrically shaped frame
636	Tools also adjustable about vertical or longitudinal axes	691	V-shaped frame
637	Plural actuators, independently pivoted tool bars	692	Mounted on transverse or oblique tool bar
638	Gear	693	Angularly adjustable bar
639	Specific mounting for pivoted tool bar	694	Oblique bar
640	Tool group pivotally adjustable about horizontal axis	695	Laterally spaced tools
641	Beam spreader-pivoted yoke type	696	Tools in echelon (3 or more)
642	Pair of tools cooperate to move earth to or from plant row	697	Tools on opposite side of longitudinal beam
643	Spring formed tool or standard	698	Tools in transverse alignment
644	Tools longitudinally adjustable to and from transverse alignment	699	Tool with laterally spaced standards
645	Tools relatively adjustable horizontally without causing vertical displacement	700	Subsoilers
646	Laterally adjustable tools, independently free to move vertically	701	With separate vertically spaced earth working portion attached to same standard
647	Tools simultaneously adjustable about their individual, spaced vertical axes	702	Ridgers
648	Collapsible lazy tong group	703	Reversible part
649	Tool groups relatively horizontally adjustable	704	Earth engaging means
650	Also vertically adjustable	705	Portion of earth engaging assembly
651	Group pivoted about vertical axis	706	Spring biased or formed tool or tool part
652	V-shaped	707	Plural earth engaging parts relatively movable during operation
653	Nested	708	Spring formed tool or standard
654	Main central beam, tools laterally adjustable relative thereto	709	With separate or rigid earthworking portion
655	Tool adjustable vertically and laterally	710	Laterally biased
656	Tool laterally adjustable	711	Pivoted tool biased beyond pivot
657	Relatively movable during operation	712	Leaf or torsion spring
658	With interconnecting means to prevent independent lateral movement	713	Tool assumes different position for opposite draft
659	Adjustable about spaced horizontal axes	714	Tooth
660	Concurrent adjustment	715	Plural earth engaging parts relatively movable during operation
661	Vertically translatable tool	716	Rotary landside
662	Tool movable to non-use position	717	Movable moldboard
663	WITH ACTUATOR	718	Belt
664	For relatively movable earth engaging parts	719	Roller
665	Tool and runner	720	With add-on cutting or wearing edge, point or surface
666	For adjustment about longitudinal axis	721	Subsurface blade (e.g., weeder)
667	For lateral adjustment	722	Symmetrical type
668	For vertical adjustment with respect to wheeled frame	723	Separately attached wings (e.g., moldboards)
669	WITH WHEEL; OR SUPPORTED ON WHEEL FRAME OR BROADLY CLAIMED IMPLEMENT	724	Draw cut point
670	All wheels on one side of tool	725	Wings integral
671	Mounted on single longitudinal beam in tool path	726	With separable vertical cutter on centerline
672	Wheel secured to tool	727	Having separable parts joined at centerline
673	Laterally adjustable tool	728	With attached runner or depth gauge
674	With bracket to hold tool off ground	729	With additional blades attached to runner
675	Vertically adjustable tool	730	Adjustable
676	Tool follows wheel path	731	Winged
677	WITH DRAFT DETAIL	732	Lateral extent decreases upwardly
678	Spring biased hitch	733	Triangular blade
679	Adjustable	734	V-shaped tool
680	Vertical	735	Adjustable
681	TOOL, STANDARD OR CONNECTION	736	To present different working portion
682	Tool flexed to change contour	737	Relatively adjustable earth engaging parts
683	Latched in earth working position	738	Element adjusted for wear compensation
684	Tool pivots on member when member moves	739	Relatively adjustable tool and runner
685	Plural tools	740	Adjustable about horizontal transverse axis
686	Right and left hand type	741	Tool adjustably connected to standard
687	Longitudinally spaced rows	742	Laterally adjustable
688	Staggered	743	Adjustable about a vertical axis
		744	Adjustable about a longitudinal axis
		745	Vertically adjustable
		746	Welded
		747	With portion extended beyond landside
			Specific material

TOOL, STANDARD OR CONNECTION	
748	Pivoted tool
749	Having separable parts interconnected without detachable fastening means
750	Self-engaging snap fastener
751	Captive fastener or wedge tightened or engaged after assembly
752	With separable vertical planar longitudinal cutter (e. g., colter)
753	Interlocked or interfitted parts
754	Moldboard type
755	Heating or lubricating
756	Skeleton
757	Furrow slice retainer
758	Furrow slice cutter or breaker
759	With additional element juxtaposed to moldboard
760	Specific moldboard shape
761	Serrated, toothed or notched point or share
762	Specific tool and standard connection
763	With specific standard and beam connection
764	With separate runner, gauge, shoe or landside
765	Specific tool shape
766	Tool with parallel fingers or blades
767	Packer or smoother (e. g., drag)
768	Draw cut type
769	Separable parts
770	Angularly related tool surfaces
771	With curved surface
772	Tool comprises plural parts
773	Specific standard
774	With lateral offset
775	Braced
776	MISCELLANEOUS (e. g., FRAMES)

## CLASS 222, DISPENSING

Original Classification M. F. Bailey, M. P. Smith 1944  
 Subsequent Revision T. L. Stam  
 Definitions in Bulletin No. 324

- 1 PROCESSES OF DISPENSING
- 2 CHECK CONTROL
- 3 GAS OR VAPOR DISPENSING
- 4 With non-gaseous material dispensing
- 5 With cutter or punch
- 6 Parallel connected, serially used
- 14 CUT-OFF OPERATED BY SELECTIVELY  
PRE-SET VOLUME OR RATE  
OF FLOW RESPONSIVE MECH-  
ANISM
- 15 With means to prevent change of setting  
during discharge
- 16 Operating cycle including reset to starting  
position
- 17 Moving cut-off operating element with  
variable initial position
- 18 Having plural revolutions
- 19 Plural dials
- 20 Cut-off by valve closing
- 21 Cut-off by single trapped volume
- 22 Cut-off set after discharge begins
- 23 WITH RECORDER, REGISTER, INDICATOR,  
SIGNAL OR EXHIBITOR
- 24 Register with shutter
- 25 Plural
- 26 Two or more volume devices
- 27 Register and signal
- 28 With common operating means
- 29 Plural scale
- 30 Recorder
- 31 With motion ratio adjusting means, and/or  
relatively adjustable scale and  
pointer
- 32 With zero-setting mechanism:
- 33 Operating cycle including reset to zero
- 34 With means to prevent zero-setting  
during discharge
- 35 With means to prevent discharge prior  
to zero-setting
- 36 Totalizer for successive dispenser cycles
- 37 Varying cycles or quantities per cycle
- 38 Reciprocating (including oscillating)  
dispenser part
- 39 Audible
- 40 Flow and/or overflow type
- 41 Position or extent of motion indicator
- 42 Selection from plural outlets, valves  
or traps
- 43 Comprising an adjustable stop or stops
- 44 Scale and pointer, with detents
- 45 Flexibly connected indicator and dis-  
penser element
- 46 Common screw means for indicator ele-  
ment and dispenser part
- 47 Indicating element rigidly carried by  
movable dispenser element
- 48 Pivoted or rotary dispensing part
- 49 Slidable indicator element projecting  
from container
- 50 Scale on container
- 51 Float level indicators
- 52 AUTOMATIC CONTROL
- 53 Involving conveying conduit jacket and/or  
inert atmosphere (including  
vacuum) providing means
- 54 Temperature responsive or soluble  
controller
- 55 Constant weight, volume or pressure  
control by output

- 56 AUTOMATIC CONTROL
- 56 Delivery from source controlled by quantity  
in discharging-receiver
- 57 By weight, volume or pressure of a second  
dispensed material
- 58 By the weight of the material in the supply  
container
- 59 Cut-off operated by rate of flow responsive  
mechanism
- 60 Single complete revolution of controller  
element
- 61 Of dispensers with fluid pressure discharge  
assistant
- 62 Float controlled pressure liquid
- 63 Motor control
- 64 Material level control
- 65 Full and/or empty interlock
- 66 Empty container cut-off
- 67 Float operated flow controllers
- 68 Plural
- 69 For vent only
- 70 WITH TIMING MECHANISM
- 71 VOLUME OR RATE OF FLOW METERING
- 72 With meter by-pass, gas separation,  
anti-syphon priming
- 73 With hose pressure relief or maintenance
- 74 HOSE OR OTHER MOVABLE DISCHARGE  
GUIDE INTERLOCKS AND  
INTERCONNECTIONS
- 75 Switch or motor control and discharge  
controller actuator
- 76 ELECTRICAL CONTROLS (SYSTEMS)
- 77 WEIGHING
- 78 SIMULATIONS
- 79 Firearm
- 80 WITH CUTTER AND/OR PUNCH
- 81 To form dispensing opening in container
- 82 With discharge assistant
- 83 Mounted for relative motion
- 83.5 With sleeve or rest for container cut
- 85 For cutting plural openings
- 86 With sleeve or rest for container cut
- 87 With container destroying means
- 88 With sleeve or rest for container cut
- 89 With non-friction fit means to secure  
discharge guide to container
- 90 Abutment for container interior
- 91 Screw
- 92 COLLAPSIBLE WALL TYPE CONTAINER
- 93 With additional article holding means
- 94 Plural container and/or compartment
- 95 With wall collapsing means
- 96 With interconnected flow controller or  
closure operating means
- 97 Plural types
- 98 Winding and roller types
- 99 Winding type
- 100 With casing or support
- 101 Roller type
- 102 Plural roller
- 103 Clamping type
- 104 Twisting type
- 105 With casing or support
- 106 Combined
- 107 Non-metallic
- 108 DRIP, LEAKAGE OR WASTE CATCHING OR  
DISPOSAL
- 109 Return to main supply
- 110 Valved
- 111 With enclosing cover
- 113 WITH ILLUMINATOR OR BURNER
- 129 PLURAL SOURCES, COMPARTMENTS,  
CONTAINERS AND/OR WITH  
SPACED JACKET
- 129.1 Cabinet type dispenser for single mixed drinks
- 129.2 One ingredient operates dispensing means  
for another

PLURAL SOURCES, COMPARTMENTS, CONTAINERS AND/OR WITH SPACED JACKET		MOVABLY MOUNTED SUPPLY CONTAINER	
	Cabinet type dispenser for single mixed drinks	172	Rotatable
129.3	With ingredient charge measuring	173	Peripheral discharge
129.4	Plural measured charges in single drink	174	With annular outlet
130	At least one non-dispensing	175	WITH CASING OR SUPPORT
131	Jacketed	176	Pole or extension
132	Three or more diverse sources	177	Body carried and/or operated type
133	Measured discharge from one and indefinite flow from another	178	Ambulant
134	Interconnected discharge volume varying means	179	Ground wheel operated dispensing means
135	With discharge assistant for each source	179.5	With motor
136	Single, operable on material from all sources	180	With pedal controlled discharge means
137	Unitary reciprocating	181	Removable for discharge
138	Two or more rotary or swinging	182	Bracket or suspension supported
139	Co-axial	183	For bottom discharge
140	Vertical axis	184	Enclosing cover for actuating parts of discharging means
141	Single plane	185	Jacketed
142	Parallel axes	186	Extended sidewall base
142.1	Hand manipulable shaker type	187	For bottom discharge
142.2	Selection by relative movement between containers or containers and casing	188	Foot piece or rest
142.3	Containers removable from base or casing	189	WITH WICK OR ABSORBENT MATERIAL FEED
142.4	Selection as a result of container shape, configuration or arrangement	190	WITH FLUID-TRAP-SEAL FOR INLETS OR OUTLETS (e.g., VENTS)
142.5	Container within container concentrically arranged	191	WITH STRAINER, FILTER, SIFTER, FLAME ARRESTER OR FORAMINOUS GUARD
142.6	With common selector	192	WITH MATERIAL TREATMENT OR CONDITIONING MEANS
142.7	Interconnected relatively movable closures	193	WITH TOOL OR IMPLEMENT HANDLE
142.8	Bodily slidable closure	194	COMBINED
142.9	Axially rotary closure for axial outlets	195	FLUID FLOW DISCHARGE
143	Packing or stacking arrangements	196	From movable or conveyer type trap chamber
144	Rotatably mounted assembly	197	WITH GAS AGITATION
144.5	With selecting means	198	JARRING AND/OR VIBRATING
145	With common discharge	199	Hand manipulable shaker type
146	WITH HEATING OR COOLING MEANS	200	Movable outlet element
147	WITH REFILL PREVENTING MEANS	201	Pattern type outlet with hole clearers
148	WITH CLEANING MEANS	202	Caged outlet element
149	Element extending through dispenser outlet	203	Guided or restrained internal element
150	Operated by resilient container walls	204	Movable or conveyer type trap chamber
151	Extending inwardly through container outlet	205	Single outlet bounded by plural vibrating members
152	WITH CONVEYING CONDUIT JACKET AND/OR INERT ATMOSPHERE (INCLUDING VACUUM) PROVIDING MEANS	206	Bottom forming member reciprocable (including oscillatable)
153	WITH LOCK OR FASTENING SEAL	207	Member reciprocable (including oscillatable) transversely of material flow
154	INSPECTION DEVICES	208	Discharge rotor is actuator for vibratable wall
155	External gauge tubes	209	Supply container wall flexing
156	Sight openings	210	Flexible wall
157	Graduated for level determination	211	SIPHON COMBINED WITH DISCHARGE ASSISTANT
158	Graduated transparent container or trap	212	NON-GRAVITY FEED TO TRAP OF VACUUM, GRAVITY, OR MANUAL REMOVAL TYPE
159	Transparent flow line section	213	RESILIENT WALL
160	MOVABLY MOUNTED SUPPLY CONTAINER	214	Supply container delivering to receiving chamber
161	Vibratory (i.e., for agitation of container contents)	215	Fluid pressure generating pump or pulsator and/or removable flexible wall closures
162	Moving relatively to trap, impeller or valve to cause discharge	216	With container handle or handgrip
163	Adjustable relatively to discharge assistant to vary the discharge volume	217	Internally extending outlet pipe
164	Tiltable	218	With flow controllers or closures
165	For refilling or changing cartridges or containers	219	Resilient wall actuated
166	For gravity discharge	220	Wall deflecting means
167	Rotatable	221	Non-metallic
168	Vertical axis	222	AGITATOR AND/OR EJECTOR OPERATING ON MATERIAL IN EITHER (1) CONVEYER TYPE DISCHARGE ASSISTANTS HAVING TRAP CHAMBERS OR TRANSVERSE GROOVES OR (2) MOVABLE TRAP CHAMBERS
168.5	Circumferentially arranged measuring or trap chambers	223	Mounted on or in conveyer or movable trap chamber
169	Peripheral discharge	224	Radially movable ejector in rotary conveyer or trap chamber
170	With trap chambers		Double ended ejector
171	With sleeve type discharge controller		Meshing conveyer trap or groove and ejector rotor
			Cam operated agitator or ejector
			Pivoted ejector
			With pivoted striker
			Ball or roller form agitator or ejector

AGITATOR AND/OR EJECTOR OPERATING ON MATERIAL IN EITHER (1) CONVEYER TYPE DISCHARGE ASSISTANTS HAVING TRAP CHAMBERS OR TRANSVERSE GROOVES OR (2) MOVABLE TRAP CHAMBERS		WITH DISCHARGE ASSISTANT, (e. g., IMPELLER, PUMP, CONVEYER, MOVABLE TRAP CHAMBER, etc.)	
		Plural	
225	Resilient ejector	268	In sets
226	AGITATOR FOLLOWED BY DISCHARGE ASSISTANT AND/OR INTER-CONNECTED DISCHARGE CONTROLLER	269	With common discharge volume varying means
			Variable capacity rotors
227	Three or more in series	270	Container wall sections carrying set units
228	Flexible or pivoted agitator carried by assistant or controller movable about an axis	271	With interior material discharge guides between units
229	Axially aligned, with axially rotary and longitudinal movement	272	Rotary
230	Biasing means constitutes agitator	273	Oppositely directed
231	Free engagement type connection	274	Coaxial only
232	Connection through eccentric carried by rotary assistant or controller	275	Spaced units
233	One rotary and one reciprocating (including oscillating)	276	Reciprocating (including oscillating)
234	Reciprocating, non-pivoted	277	Unitary
235	Rotary agitator	278	Pivoted
236	All rotary	279	Alternatively usable
237	Relatively rotatable rings and/or plates	280	Movable or removable baffles or covers for non-used assistant
238	Parallel axes	281	Single outlet formed by plural discharge assistants
239	Coaxial	282	Parallel rolls
240	Helix or vane agitator and terminal element	283	With discharge volume varying means
241	Agitator and terminal screw, helix, or vane	284	Plural
242	Agitator rigidly mounted on succeeding device	285	Trap chambers in series
243	All reciprocating (including oscillating)	286	Source and assistant relatively adjustable axially of source outlet
244	Relatively movable in parallel planes, non-pivoted	287	Sleeve-type discharge controller for outlet
245	Pivoted and non-pivoted reciprocating elements	288	Adjustment in relatively movable actuator
246	Reciprocable axially of outlet	289	Interchangeable, removable or selectively usable discharge assistant or element thereof
247	Pivoted only	290	Reversible
248	Unitary	291	Adjustable deflector for conveyer type discharge assistant
249	FLOATING PISTON WITH PLURAL OR ALTERNATE DISCHARGE	292	Retractable projections
250	With discharge volume varying means	293	Interconnected radially movable adjusting means for plural rotor projections or traps
251	WITH DISCHARGE ASSISTANT, (e. g., IMPELLER, PUMP, CONVEYER, MOVABLE TRAP CHAMBER, etc.)	294	Rotor having plural adjustable parts of rotor form
252	Plural	295	Substantially coextensive disks and/or rings, axially rotary adjustment
253	With material operated differential piston	296	Axially adjustable
254	Three or more in series	297	Disk with axially projecting pins
255	Pumps only	298	Cup rotor with horizontal axis
256	Follower combined with casing enclosed impeller	299	Groove or trap rotor slidable through discharge channel
257	Interconnected with movable nozzle	300	With channel blocking means
258	Utilizing fluid pressure and/or motor	301	With non-rotary sleeve
259	Follower and impeller coaxial or parallel and interconnected	302	Rose washer bearing
260	Follower and impeller coaxial or parallel and interconnected	303	Material passage parallel to axis of rotation
261	Utilizing fluid pressure and/or motor	304	Groove or trap blocking means
262	Utilizing fluid pressure and/or motor	305	Axial pocket trap
263	Utilizing fluid pressure and/or motor	306	Movable or conveyer type trap chamber with capacity varying means
264	Rotors with concentrically arranged sets of axial trap chambers	307	Single inlet-outlet, adjustable bottom
265	In sets	308	Wall with straight line movements
266	With selecting means	309	Screw adjusting means
267	With common discharge volume varying means	310	Adjustable stroke pump piston, pulsator or follower
		311	With discharge controller
		312	Rotor with discharge controller
		313	Discharge passage between drum type rotor and controller
		314	Baised controller
			Reciprocating non-pivoted controller

WITH DISCHARGE ASSISTANT, (e. g., IMPELLER, PUMP, CONVEYER, MOVABLE TRAP CHAMBER, etc.)		WITH DISCHARGE ASSISTANT, (e. g., IMPELLER, PUMP, CONVEYER, MOVABLE TRAP CHAMBER, etc.)	
	With discharge volume varying means		Movable or conveyer type trap chamber
	With discharge controller		Reciprocating (including oscillating) conveyer type trap chamber
315	Rotor with discharge controller	365	Plural concentric enlargements on stem
316	Cup rotor with horizontal axis	366	Single inlet-outlet
317	Sectional discharge controller	357	Rotary conveyer type trap chamber
318	On container side of rotor	368	Single inlet-outlet
319	With-by-pass or return to supply	369	Scoop type
320	Displacement type	370	Axial inlet and outlet
	With movable nozzle interconnected therewith	371	Endless belt carried
321	With material supply container and discharge assistant casing	372	With material supply container and discharge assistant with casing (e. g., supply con- tainer and pump)
322	Movable element actuator projecting through outlet	373	Fluid pressure discharge
323	With container handle or handgrip	375	With anti-leak or anti-siphon means or full stroke mechanism
324	With material supply container and discharge assistant casing	376	With plural point inlet to casing
325	Insertable cartridge or removable container	377	Inlet trap (e. g., sump)
326	With follower	378	Aligned discharge assistant, actuator, container and nozzle
327	Part of cartridge or removable container	379	Telescopic outlet and/or discharge assistant casing inlet
328	With material discharge guide on container side of discharge assistant	380	Valved outlet
329	Removable or movable depending cups for rotors	381	Movable discharge assistant casing
330	With plural material outlets	382	Internally extending outlet pipe
331	Of different types	383	Container mounted pump or pulsator
332	With vent passage for movable trap chamber	384	With piston holding means
333	Motor operated	385	Pump or pulsator casing within supply container
334	Fluid motor		
335	Actuated by pressure of or suction on material to be dispensed	386	Container with follower
336	With biasing means for discharge assistant and/or its casing	386. 5	Non-rigid follower
337	Joint sealing bias only	387	Valved outlet, movable discharge guide and/or gas vent
338	Movable encasing wall	388	With side wall filling opening
339	For oscillating discharge assistant	389	Fluid pressure actuated
340	For reciprocating piston or follower type impeller	390	Screw actuated
341	Biasing means within material chamber or passage	391	Intermittent grip type actuator
342	With scraper or wiper for or carried by discharge assistant	392	Ribbon type follower and/or strand actuator
343	With retractable projections	393	Scoop type
344	Movable or conveyer type trap chamber	394	Fluid pressure
345	With striking or clearing means	395	Liquid pressure
346	Not part of the supply container outlet	396	With pressure limiting means
347	Plural and/or interconnected with gate at point of trap re-entry to supply	397	With pressure fluid relieving means
348	Sectional	398	Telescopic container and/or outlet
349	Yielding	399	With gas pressure supplying reservoir
350	Pivoted	400. 5	Simultaneously operative material discharge valve and pump or pulsator operating member
351	Reciprocating	400. 7	Unitary mounting for fluid pressure inlet and material outlet
352	Brush	400. 8	With pump or pulsator
353	Barometric or angle of repose	401	Container mounted fluid pressure generating pump or pulsator
354	With relatively movable cut-off carried by trap chamber	402	With piston or pulsator holding means
355	With cut-off interconnected with trap chamber for operation	403	Film accumulating type
356	Dipping trap chamber, non-rotary, non-endless belt	404	Compound motions
357	Compound movement	405	Discharge of material from top of supply
358	Oscillating	406	Deformable discharging elements
359	With relatively movable actuator	407	Biased
360	Intermittent rotary	408	Conveyer type with deflector
361	Reciprocating (including oscillating) conveyer type trap chamber	408. 5	Agitator rigidly mounted on movable closure
362	Oscillating	409	Reciprocating (including oscillating)
363	Single inlet-outlet	410	Rotary
364	Pivot lying in chamber rim	411	Central discharge
		412	Helically arranged projections (e. g., screws)
		413	Screw with terminal outlet only
		414	Peripheral surface material contact

- WITH DISCHARGE ASSISTANT, (e. g.,  
IMPELLER, PUMP,  
CONVEYER, MOVABLE  
TRAP CHAMBER, etc.)
- 415 Endless belt
- 416 SIPHON
- 420 DROP FORMERS
- 421 Grooved closure and/or container neck  
or outlet
- 422 With valve
- 423 WITH FILM ACCUMULATING MATERIAL  
REMOVERS
- 424 WITH MATERIAL RETURN TO SUPPLY
424. 5 SUPPLY CONTAINERS WITH TRAPS
- 425 With trap chamber cut-offs
- 426 Plural traps, non-serial
- 427 Single rotary cut-off member
- 428 Interconnected discharge controllers
- 429 For simultaneous discharge
- 430 Of different capacities
- 431 With plural discharge
- 432 Plural level discharge volume varying
- 433 Independent discharge controllers
- 434 With discharge volume varying means
- 435 With means to prevent adjustment  
during discharge
- 436 Trap chambers in series
- 437 Barometric or angle of repose
- 438 With means to change trap  
chamber volume
- 439 Movable cut-off or cut off seat  
carrying elements
- 440 Having straight-line motion
- 441 With container handle or handgrip
- 442 With vent passage for trap
- 443 With by-pass or free flow adjustment
- 444 Single inflow-outflow trap passage
- 445 Non-rigidly interconnected cut-offs
- 446 Free engaging element carried by  
one cut-off
- 447 Both reciprocating, non-pivoted
- 448 With relatively movable actuator
- 449 With biasing means
- 450 For both inlet and outlet
- 451 Rigidly interconnected or unitary  
cut-offs
- 452 Rotary and/or pivoted only
- 453 Axially slidable only
- 454 With tiltable container trap only
- 455 Supplementary trap
- 456 Single discharge passage forming trap
- 457 Barometric or angle of repose trap chamber
457. 5 HAND MANIPULABLE SHAKER WITH  
REVERSED OUTLET PASSAGE
- 459 STATIONARY AGITATOR
- 460 FUNNEL TYPE OUTLET
- 461 Movably interconnected
- 462 Integral
- 463 ROCKABLE OR WEIGHTED
- 464 INTERNALLY EXTENDING OUTLET PIPE
- 465 WITH CONTAINER HANDLE OR HANDGRIPS
- 466 Plural handles
- 467 Detachable
- 468 Vent in handle
- 469 Movable handle interconnected with  
flow controller or closure
- 470 Handle and actuator for flow controller  
or closure juxtaposed for  
one-handed manipulation
- 471 Non-pivoted actuator reciprocable  
lengthwise of handle
- 472 Pivoted actuator
- 473 On handle
- 474 Generally lengthwise of handle
- 475 Handle as spout, spout holder or guard
- 476 SPACED, ALTERNATELY SEATED FLOW  
CONTROLLERS OR CLOSURES  
FOR SINGLE OUTLET
- 477 RETARDED OR DELAYED ACTION FLOW  
CONTROLLERS OR CLOSURES
- 478 WITH PLURAL OPENINGS OR DISCHARGE  
GUIDES
- 479 Coterminous (barometric)
- 480 Hand manipulable shaker, diverse type  
openings (e. g., dredge top)
- 481 Having flow controllers or closures
481. 5 With movable flexible or remotely  
connected vent pipes
- 482 Plural and/or single for plural openings
- 483 Interlocked controllers and/or closures
- 484 Interconnected for operation and/or  
integral
- 485 For plural dispensing outlets
- 486 Variable number exposed and/or  
variably opened
- 487 Non-rigidly interconnected
- 488 For single passage into which plural  
passages merge
- 489 Screw type flow controller or closure
- 490 SLITTED RESILIENT DIAPHRAGM OR NIPPLE
- 491 OUTLET ELEMENT OPERATED BY PRESSURE  
OF CONTENTS
- 492 Axially slidable tube, sleeve, or apertured cap
- 493 Axial discharge
- 494 Spring form, resilient or compressible  
flow controller or closure
- 495 Reciprocable, non-pivoted
- 496 With biasing means
- 497 With additional means to hold against  
motion
- 498 SNAP ACTING OUTLET ELEMENT
- 499 Axially movable tube, sleeve, or  
apertured cap
- 500 GRAVITY OR INERTIA OPERATED MOVABLE  
OUTLET ELEMENTS
- 501 MOVABLE OUTLET ELEMENT ACTUATOR  
PROJECTING THROUGH DIS-  
CHARGE GUIDE
- 502 SECTIONAL FLOW CONTROLLER OR CLOSURE
- 503 Interconnected for relative motion
- 504 MOTOR OPERATED OUTLET ELEMENT
- 505 WITH RELATIVELY MOVABLE ACTUATOR  
FOR OUTLET ELEMENT
- 506 Plural flow controllers or closures
- 507 Annular, outlet surrounding actuator
- 508 For swingable elements in receptacle interior
- 509 For non-rotary outlet element re-  
ciprocable axially of  
discharge opening
- 510 OUTLET ELEMENT IN ONE WALL, ROD  
ACTUATOR THROUGH CON-  
TAINER INTERIOR AND  
ANOTHER WALL
- 511 WITH RESILIENT BIASING MEANS FOR  
OUTLET ELEMENT
- 512 Joint sealing bias only
- 513 For movable tubes, sleeves, or  
apertured caps
- 514 Axially slidable only
- 515 For elements having plural, diverse motions
- 516 For rotary elements
- 517 For pivoted and swingable elements
- 518 For elements reciprocable axially of  
discharge opening
- 519 AXIALLY ROTARY AND LONGITUDINALLY  
MOVABLE TUBES, SLEEVES,  
OR APERTURED CAPS
- 520 Axial discharge
- 521 Axial stationary closure plug

- 522 AXIALLY SLIDABLE TUBES, SLEEVES,  
OR APERTURED CAPS
- 523 Sectional, telescoping
- 524 With telescopic guide pin
- 525 Axial discharge
- 526 MOVABLE MATERIAL DISCHARGE GUIDE
- 527 Foldable, bendable, collapsible or  
flexible
- 528 Closure type
- 529 With flow controller or closure
- 530 Non-use securing means
- 531 Closure type
- 532 With additional flow controller,  
closure or seal
- 533 Swingable
- 534 Into container recess
- 535 From container interior
- 536 With flow controller or closure
- 537 With flow controller or closure
- 538 NON-USE HOUSING OR SECURING MEANS  
FOR DISCHARGE GUIDES
- 539 Reversible to extend into or out of  
container
- 540 OUTLET SEATED IN CONTAINER RECESS
- 541 WITH FRANGIBLE ELEMENT FOR OUTLET
- 542 WITH PACKING TYPE SEAL FOR OUTLET
- 543 WITH SINGLE STRAND, CORD OR WIRE  
CONNECTOR FOR REMOVABLE  
OUTLET ELEMENTS
- 544 WITH FLOW CONTROLLER OR CLOSURE
- 545 Plural and/or carried by separably  
attached element
- 546 Cap carried axial plug
- 547 With interior material guide or  
restrictor
- 548 Rotary, axially
- 549 With axial longitudinal motion
- 550 And additional pivotal motion
- 551 Non-apertured screw cap
- 552 Screw plug or disc
- 553 Apertured sleeve or cap, non-axial  
discharge
- 554 Plug
- 555 Between fixed plates or flanges
- 556 Pivoted
- 557 Pivot axis parallel to axis of outlet  
opening
- 558 Bail type
- 559 Reciprocatory
- 560 Arcuate path
- 561 Between fixed plates or flanges
- 562 Cap
- 563 Plug
- 564 WITH INTERIOR MATERIAL GUIDE OR  
RESTRICTOR
- 565 SIFTER, SPRINKLER OR PLURAL  
OPENING PATTERNS
- 566 NOZZLES, SPOUTS AND POURING DEVICES
- 567 With separable attaching means
- 568 Screw
- 569 Abutment for container interior
- 570 Rim mounted, interengaging groove  
and bead or flange
- 571 Anti-drip
- 572 Integral with container walls
- 573 Reinforced or with container connected  
brace
- 574 With folded seam
- 575 MISCELLANEOUS (e. g., OUTLET SHAPES)

## APPENDIX II

### *Class Definitions*

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- 65 Glass Manufacturing
- 91 Motors, Expansible Chamber Type
- 260 Chemistry Carbon Compounds, subclasses 157-163
- 318 Electricity, Motive Power Systems, subclasses 32 and 33



Date: December 1963

Class 65, GLASS MANUFACTURING

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Cl. Def.

## CLASS DEFINITION

## CONTENTS

- I. GENERAL STATEMENT OF CLASS SUBJECT MATTER
- II. GLOSSARY
- III. GENERAL LINES WITH OTHER CLASSES
  - A. Classification lines in subclasses of Class 65.
  - B. Other class lines
- IV. MISCELLANEOUS SEARCH NOTES
  - A. Process and apparatus
  - B. Products

I. GENERAL STATEMENT OF CLASS SUBJECT MATTER

This class provides for (1) processes and/or apparatus for making stock or articles of those ceramic masses, which generally include a "glass former" or an oxide which approaches glass forming properties, in their composition and which are formed by fusion of raw materials (generally mixtures, most of which are of an earthy nature - as distinguished from metallic, organic, etc., - silicon, silica, and slag are included) at ordinary high furnace temperatures, by working (molding, shaping, etc.) of the mass after being melted or changed to a plastic or softened state by heating; and (2) processes and/or apparatus for treating stock or articles made by (1) above unless otherwise provided for as shown in Section III below.

I. Included within the scope of the class definition are:

1. Glass fiber or filament and mineral wool making.
2. Manufacturing processes and/or apparatus including a step of, or means for adhesively bonding glass directly to another part by welding with or without use of an intermediate ceramic or vitreous material.
3. Manufacturing processes and/or apparatus including a step of, or means for forming a glass article from molten or softened glass.
4. Processes and/or apparatus including a step of, or means for treating glass while in a molten or solid state.
5. Processes and/or apparatus including a step of, or means for treating a glass preform to change a physical or chemical property thereof.
6. Processes and/or apparatus for repairing or cleaning glass working or treating apparatus.

## II. GLOSSARY

ANNEAL: See subclass 117.

BAIT: See subclass 352.

BATCH: A properly proportioned mixture of raw materials to be delivered to a melting apparatus.

BATCH CHARGER: Mechanical means for introducing a batch to a melting apparatus.

BEAD: (1) A small piece of glass fused onto an electrical conductor, (2) an enlarged rounded portion on an edge of an article or stock material, (3) small discrete particles of glass.

BLOWING: Shaping or forming an undefined mass of glass in a soft state by introducing gas within a confined opening within the mass, i.e., by inflating.

BRIDGE (-WALL): A hollow wall generally having an air space between refractory blocks from which it is formed and providing an opening or throat adjacent its bottom used in a tank furnace to separate a working end from a fining or melting zone.

CASTING: Forming a glass preform by flowing molten glass in the form of a stream into or onto molds, rolls or tables. (Teeming is synonymous to casting).

COATING: See subclass 60.

CORRUGATING: Shaping a layer throughout its thickness into a row of wavelike folds.

CRACKLED: Glassware having a surface which was intentionally cracked by water immersion and partially healed by reheating.

CULLET: Waste or broken glass.

DEBITEUSE: A slotted floating, refractory block through which glass issues in the formation of a glass sheet during a drawing operation.

DEPUTER: See debiteuse.

DEVITRIFY: The changing of glass in the amorphous state to crystalline state generally by holding a glass melt at a temperature which favors crystal growth.

DOGHOUSE: A boxlike wing on a glass furnace through which a batch or floaters, etc., are introduced into the furnace.

## Cl. Def.

**DRAWING:** Forming stock, generally sheet or tube, by utilizing the self-cohesiveness of glass in a plastic condition to effect an operation similar to a "taffy-pull".

**DRAW RING:** A refractory device placed in a supply of molten glass to define an area for drawing.

**DRAW SHIELD:** Baffle means isolating stock being drawn from the hot atmosphere existing above a supply of molten glass.

**EMBOSSING:** Altering a surface configuration only of glass by raising a boss or protuberance thereon or causing surface portions to be depressed below the plane of the glass surface.

**FELTING:** See subclass 4.

**FIBER:** See subclass 1.

**FILAMENT:** See subclass 1.

**FINING:** See subclass 136.

**FIRE-POLISHING:** heating of the outer surface of hard glass to a temperature where that surface only melts and surface tension causes smoothing thereof, the heating usually being by fire or flame contact of the glass surface.

**FLASHING:** Applying a thin layer of opaque or colored glass to the surface of clear glass, or vice versa.

**FLOATERS:** Refractory blocks floating on molten glass in a tank furnace to prevent gall or scum from entering the working end.

**FUSION BONDING:** Welding by bringing glass, while molten or softened by heating, into intimate contact with another part with subsequent cooling to solid phase whereby uniting is effected.

**GATHERER:** Means used to remove discrete charges of molten glass from a supply.

**GLASS:** For the purpose of this class is

**A. An inorganic product**

1. The constituents of which generally include a "glass former" (e.g.,  $As_2O_3$ ,  $B_2O_3$ ,  $GeO_2$ ,  $P_2O_5$ ,  $SiO_2$ ,  $V_2O_5$ ) which has an essential characteristic of creating or maintaining, singly, or in a mixture, that type of structural disorder characteristic of a glassy condition, other oxides which approach

glass forming properties (e.g.,  $Al_2O_3$ ,  $BeO$ ,  $PbO$ ,  $Sb_2O_3$ ,  $TiO_2$ ,  $ZnO$  and  $ZrO_2$ ) as well as oxides that are practically devoid of glass forming tendencies (e.g.,  $BaO$ ,  $CaO$ ,  $K_2O$ ,  $Li_2O$ ,  $MgO$ ,  $Na_2O$  and  $SrO$ ); however, pure and modified silica, silicon and slag are also included,

2. formed by fusion and cooled to a rigid condition generally without crystallization,
3. having no definite melting point (whereby the mass has the characteristic of passing through a plastic state before reaching a liquid state when heated),
4. incapable in the solid state of permanent deformation,
5. and which fractures when subject to deformation tension.

**GLASS TREATING:** Effecting a change in a physical or chemical property of glass, generally involving specific heating followed by controlled cooling.

**GLASS WORKING:** Molding, shaping, severing or uniting of glass while in a plastic state.

**GOB:** A discrete portion of molten glass (a) delivered by a feeder or (b) gathered on a punty or blow pipe.

**HOMOGENIZE:** See subclass 134.

**MARVERING:** Rolling a gather of glass on a flat plate whereby it is shaped and cooled.

**MOIL:** Surplus or waste glass which must be removed from the apparatus or a product after a glass working operation.

**NECK RING:** That portion of a segmented mold used to form a neck portion of a hollow article.

**ORBITING:** Causing movement in a regular, generally a circular or elliptical path around a fixed point.

**PARISON:** A partially shaped article of manufacture requiring further significant shaping to arrive at the form of a completed useful article.

**PARTING LAYER:** See subclass 24 for definition.

**PASTE MOLD:** A mold with an inner lining of a paste (generally made from resins and linseed oil, soap, etc.) which is brushed into a hot mold and kept wet so that glass within the mold rides on a steam cushion while being formed.

**PONTIL:** A dipstick used to gather charges of molten glass, punty, puntil, pontee, and ponto are local variants.

**PREFORM:** Stock material that has been given a shape (the term preform is used interchangeably with article, product, parison and blank).

**PRESS MOLDING:** See subclass 305.

**PURIFY:** See subclass 134.

**PUNTY:** See Pontil

**RESHAPING:**

A. Changing the gross overall configuration of a glass preform by

- (1) confining a glass preform within a configured mold and effecting significant flow of the glass to cause it to assume the configuration of the mold or
- (2) distorting a glass preform by bodily moving a portion of it throughout its entire thickness relative to a second portion during which the thickness of the workpiece remains substantially the same and no significant flow of the glass occurs, i.e., bending.

B. Changing at least one dimension of a glass preform throughout its perimeter without any appreciable change in the original configuration thereof, e.g., stretching and shrinking.

**SINTERING:** The coalescence of particles into one solid mass through heating, generally with melting limited to a surface layer only of each particle.

**SLAG:** See subclass 19.

**SLINGER:** See subclass 154.

**SMOOTHING:** Removing surface irregularities or imperfections.

**SOFTENED GLASS:** Glass that has been heated to a temperature at which it is pliable or liquid.

**SOFTENING POINT:** The temperature at which a uniform fiber, 0.5 to 1.0 mm. in diameter, elongates under its own weight at a rate of 1 mm. per minute when the upper 10 cm. of its length is heated in a prescribed furnace \* at the rate of approximately 50C. per minute. (\* See "A Method for Measuring The Softening Temperature of Glass", J. T. Littleton, J. Am. Ceramic Soc., 10(4), 259 (1927).

**SURFACE DEFORMATION:** A reshaping operation involving only the surface of the glass preform and only partially through the thickness and wherein the overall shape of the preform throughout its breadth and width is unaltered.

**TEMPER:** See subclass 114.

### III. GENERAL LINES WITH OTHER CLASSES

#### A. Classification lines in subclasses of Class 65

Class	Class 65 Subclass
8	60
13	134
19	4
29	3, 36
51	61
77	166
83	112, 133, 174
106	33
117	30, 50, 60
134	168
156	1, 23, 31, 36, 37, 42
162	4
241	21
250	111
259	134, 178
263	111, 136, 335, 336, 347, 349, 355

#### B. Other Class Lines

##### SEARCH CLASS:

18, Plastics, appropriate subclasses, for apparatus for working or treating plastic materials not otherwise provided for. A patent disclosing working or treating of named materials for Class 18 and Class 65 is classified in Class 18 unless the only species claimed is glass or the only specific example relates to glass in which case the patent is classified in Class 65. A patent claiming a combined apparatus for Class 18 and Class 65 is classified in Class 65.

22, Metal Founding, appropriate subclasses, for processes and apparatus for metal working operations therein provided. A patent disclosing working of named materials for Class 22 and Class 65 is classified in Class 22 unless the only species claimed is glass or the only specific example relates to glass in which case the patent is classified in Class 65. Combined processes including metal working and glass working and/or treating are classified in Class 22. See Class 22 subclasses 57+ and 200+ for apparatus for or a process of casting metal on a glass preform.

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23, Chemistry, subclasses 273 and 295+ for processes or apparatus directed to crystallizing a material within the class definition of Class 23. Although silicon and silicon dioxide are arbitrarily considered to be glass for Class 65, a process of, or apparatus for growing crystals of these materials is placed in Class 23 (for a process exception, see (5) Note in Class 148, subclass 1.5+)

even though a rod is used as a bait unless the shape formed is not a result of crystallization or deposition on the rod. A combination of crystallization and specific glassworking and/or treating of silicon or silicon dioxide is placed in Class 65. A patent claiming a Class 23 species of crystallization and a Class 65 species or having a multiple disclosure with generic claims only is classified in Class 23. A process of chemically manufacturing silicon or silicon dioxide combined with nominal shaping or nominal heat treating is classified in Class 23.

25, Plastic Block and Earthenware Apparatus, appropriate subclasses, for apparatus directed to (1) shaping a mass of green siliceous material and subsequently firing or curing the material to set the material, or (2) placing discrete siliceous particles other than glass fibers or mineral wool onto a mold surface which particles are heated on or subsequent to contact with the surface to fuse the particles to each other. An apparatus directed to (1) heating a material within the scope of Class 65 to the molten state and forming a shaped preform therefrom, or (2) bulk depositing glass fibers into a mold surface and thereafter fusing the fibers to each other are classified in Class 65. A combined Class 25 and 65 operation is classified in Class 65.

29, Metal Working, subclasses 400+ and 33+ for a process or apparatus, respectively, directed to glass working or treating combined with a metal working operation or means.

53, Package Making, particularly subclasses 7+, 79+ and 266+ for methods or apparatus, respectively for filling and/or evacuating glass receptacles and sealing same by a glass working operation. See the references to Class 65 in the notes to the definition of subclass 7 of Class 53; and subclasses 21+ and 111+ for a process

of, or apparatus for sealing-off per se of a filled glass container by a glass working operation under conditions which protect or affect the contents of the container except where the

glass working operation inherently results in protecting or affecting the contents in which case the process and apparatus are classified in Class 65.

106, Compositions, Coating or Plastic, subclass 39+, particularly subclasses 40+, 42 and 47+ for processes for preparing glass compositions, crystallizing glass compositions and of forming pores or open cells within a glass composition. The combination of preparing, or crystallizing or pore forming of glass compositions with specific glass working and/or treating is classified in Class 65, however,

(1) a step of melting with heating to a specific temperature, or (2) the recitation of a forming step by name only (e.g., drawing, working, blowing, pressing, etc.), or (3) refining molten glass by name only is not enough to prevent placement in Class 106. A Class 106 operation combined with specific glass treating is placed in Class 65 however, mere recitation of "treating the glass", "annealing" or "tempering" by these words only is not enough to prevent placement in Class 106.

202, Distillation, appropriate subclasses, for processes of, or apparatus for distillation of glass while in the liquid state. The inclusion of the step of melting solid glass to the liquid state does not exclude the patent from Class 202.

204, Chemistry, Electrical and Wave Energy, subclass 154+, for processes for applying electrical or wave energy to molten or preformed glass to bring about a chemical change, e.g., color, of at least one constituent of the glass; the line stated in the class definitions of Class 204 above the "Notes" for claims defining a Class 204 operation combined with an operation provided for in another class is to be followed for classification of claims defining both Class 204 and Class 65 operations.

226, Advancing Material of Indeterminate-Length, for a process of, or means for advancing material of indeterminate-length; see Note V under the class definition of Class 226 for its line with material - modifying classes which include feeding of intermediate-length work.

264, Plastic and Non-Metallic Article Shaping or Treating: Processes, for processes of working or treating plastic materials not otherwise provided for. A patent disclosing working or treating of named materials for Class 264 and Class 65 is classified in Class 264 unless the only species claimed is glass or the only specific example relates to glass in which case the patent is classified in Class 65. A patent claiming a combined process for Class 65 and Class 264 is classified in Class 65. Class 264 takes processes directed to (1) shaping a mass of green siliceous material and subsequently firing or curing the material to set the material or (2) placing discrete siliceous particles, other than glass fibers or mineral wool, onto a mold surface which particles are heated on or subsequent to contact with the surface to fuse the particles to each other. A process directed to (1) heating a material within the scope of Class 65 to the molten state and forming a shaped preform therefrom or (2) bulk depositing glass fibers into a mold surface and thereafter fusing the fibers to each other is classified in Class 65. A combined Class 65 and 264 operation is classified in Class 65.

316, Electric Lamp and Discharge Devices, Manufacture and Repair, appropriate subclasses, for processes of, or apparatus for the manufacture, repair or salvage of electric lamps and electric lamp space discharge devices. Combined processes and apparatus including a glass working and/or treating operation and a lamp making operation are classified in Class 316. The inclusion of the step of exhausting or providing a special atmosphere in the envelope is considered a lamp making operation for Class 316. For other lamp making operations provided for in Class 316, see the class definitions of Class 316.

#### IV. MISCELLANEOUS SEARCH NOTES

##### A. Processes and Apparatus

##### SEARCH CLASS:

28, Textiles, Manufacturing, appropriate subclasses, for processes and/or apparatus involving mechanical inter-engaging of fibers or strands not otherwise provided for not combined with a glass working or treating operation.

57, Textiles, Spinning, Twisting and Twining, appropriate subclasses, for processes and/or apparatus for spinning, twisting or twining of glass fibers or filaments not combined with a glass working or treating operation.

79, Button Making, subclass 2, for a process of and/or apparatus for making buttons or parts thereof, and assembling the same except such as are formed of plastic material (e.g., glass) which are formed in molds or are molded upon a shank.

88, Optics, subclass 105 for processes of making mirrors not combined with the step of glass working or treating provided for in Class 65.

96, Photographic Chemistry, Processes and Materials, appropriate subclasses, for processes peculiar to pictures made by the action of light upon a medium sensitive to it not combined with a glass working or treating step.

148, Metal Treatment, subclasses 1.5+ for processes for making electrically conductive barrier layer material; 1.6 for processes of making single crystals of an elemental metal, alloy and an intermetallic compound and subclass 4+ for processes of treating solid metal. Silicon is considered a metal for the purposes of subclass 1.5+ of this class (148). See the search notes pertinent to these subclasses. Also see subclass 6+ for processes for producing a reactive coating on solid metal not combined with a glass working or treating operation.

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- 198, Conveyers, Power-Driven, appropriate subclasses, for conveyers, carriers and forwarders to move glass articles from one place to another irrespective of the particular physical condition of the article per se. The positive recitation of a glass working station in a claim, as such, does not constitute glass working means for Class 65.
- 266, Metallurgical Apparatus, appropriate subclasses, for apparatus peculiarly adapted for the treatment of metals and metalliferous materials.
- 269, Work Holders, appropriate subclasses, for work holders.
- 294, Handling, Hand and Hoist-Line Implements, appropriate subclasses, for manual means for handling or manipulating glassware not combined with glass working or treating means.
- 351, Optics, Eye Examining, Vision Testing and Correcting, subclass 177 for methods of making ophthalmic lenses which usually involve some combination of grinding, glass manufacturing, and adhesive bonding; and subclass 178 for methods of securing an eyeglass lens in its support, or of assembling such lenses in spectacle frames.

- 189, Metallic Building Structures, subclass 36.5 for miscellaneous bonded joints comprising metal to metal and to glass, the metal and glass joint disclosed as being formed by a glass working operation.
- 215, Bottles and Jars, appropriate subclasses, for glass bottles, jars and receptacles.
- 220, Metallic Receptacles, subclass 2.1+ for an envelope for an electric lamp or similar device, e.g., cathode ray tubes (made wholly or partly of glass) not limited to use with any specific electric device or not limited by claimed structure to electrical use, and subclass 82+ for a receptacle provided with a glass portion.
- 240, Illumination, appropriate subclasses, particularly subclasses 103+ and 106+ for glass reflectors and refractors, respectively.
- 313, Electric Lamp and Discharge Devices, appropriate subclasses, for electric lamp and electric space discharge device structures, such as cathode ray tubes, especially subclass 89+ for a screen or target, per se, for a cathode ray tube.

## Subclasses

## B. Products

## SEARCH CLASS:

- 20, Wooden Buildings, subclass 40+ for glass window structure.
- 50, Building Structures, subclass 265+ for static building structure made of glass.
- 66, Textiles, Knitting, subclass 202 for a knitted glass textile fabric or article.
- 88, Optics, subclasses 57.5 and 83 for glass lenses and windows having specific optical properties.
- 139, Textiles, Weaving, subclass 420+ for woven glass textile fabric or article.
- 161, Stock Material and Miscellaneous Articles, subclass 1+ for a critically light pervious article or stock material; subclass 45, for a hermetically sealed glass panel; and subclass 192+ for a quartz or glass layer next to a layer of some other material.

1. Processes and apparatus under the class definition directed to producing rod-like stock of sufficiently small diameter to be pliable, either (1) as continuous filaments of indefinite length, or (2) short discrete pieces.

(1) Note. For the purposes of this class, "mineral wool" is wool formed from slag.

## SEARCH CLASS:

- 18, Plastics, subclass 2.4+ for apparatus for liquid comminuting and solidifying of general application and subclass 8 for apparatus for forming fibers or filaments from siliceous materials in solution or suspension by precipitation in a reactive or solvent extractive bath or by evaporation of the solvent.
- 28, Textiles, Manufacturing, appropriate subclasses, for textile working of general applicability.
- 73, Measuring and Testing, subclass 159, for measuring and testing of a fiber per se.

Date: June 1963

CLASSIFICATION DEFINITIONS

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Class 91, MOTORS, EXPANSIBLE CHAMBER TYPE

Cl. Def.

## CLASS DEFINITION

## INDEX TO CLASS DEFINITION AND NOTES

- I CLASS DEFINITION
- II DEFINITION OF TERMS
- III MISCELLANEOUS CLASS NOTES
- IV STATEMENT RELATING TO PLACEMENT OF PATENTS INVOLVING COMBINATION AND SUBCOMBINATION SUBCLASSES
- V INDEX TO CLASSES NOTED IN (1) SECTIONS I-IV AND (2) THE SUBCLASSES OF THIS CLASS

## I CLASS DEFINITION

This class is limited to motors for converting the energy of a pressure fluid into mechanical work in which a charge of simple pressure fluid is admitted to an expansible chamber, the expansion of said chamber converting into work only the original energy of the charge, the charge after expansion of said chamber being exhausted to some place other than whence it came, and in which no energy is extracted from the charge except by expansion of the chamber, said motors when of the reciprocating or oscillating type including control of the fluid.

## (1) Note. CLAIMS NOT CONTROLLING IN PATENTS PRIOR TO 1936

Patents issued prior to 1936 have not necessarily been classified by claims so that the placement of these patents does not necessarily indicate lines of classification. However, most of the patents regardless of their age have been placed in accordance with their claimed subject matter.

## (2) Note. COMBINATIONS WITH LOAD DEVICES

Inasmuch as the basic purpose of a motor is to operate a load the inclusion of the load in the claim by name only or in general terms will not exclude a patent from this class. An exception to this general rule exists where the load on the motor is a valve. The combination of an expansible chamber motor and a valve as the load driven thereby, even if the valve is claimed by name only, is excluded from this class and will be found in Class 137, Fluid Handling, or Class 251, Valves and Valve Actuation.

This line also applies where the load is a tool; that is, a named tool driven by the motor will not exclude a patent from this class if no tool details are recited. However, if a support for the work being acted upon by the tool is claimed, classification in the appropriate tool class results even though both the tool and the support are claimed by name only. Also see the Search Class 173 note in Section III below for the line with regard to a nominally claimed tool driven by an expansible chamber motor combined with other features such as work cleansing or tool feeding.

No attempt has been made to review the classification of all patents found in classes relating to loads adapted to be driven by a motor. Thus, it is to be noted that the original classification of all patents is not consistent with the above statement as to nominally claimed loads and this particularly applies as to classes not recently reclassified. In those instances in which a body of art is known to exist in a given class, in which the load on the motor is claimed only nominally, and especially where the classification of that class provides for a fluid motor actuator for the device, currently issuing patents will not be classified as originals in Class 91 even though the load is only nominally claimed.

The means which transmits power from the working member of the motor to the load to be driven (e.g., linkage, gearing, etc.) is not considered to be the load for the motor. See the Search Class 74 note in Section III of Class 91 for a further discussion of this subject.

## (3) Note. RELATIONSHIP TO CLASS 92

Class 92 is directed to expansible chamber devices per se, and is related to Class 91 as a subcombination thereof. Class 92 is limited to expansible chamber devices in which the working member has an oscillating or reciprocating motion to expand and contract the expansible chamber. Thus, Class 92 cannot take the subcombination of any Class 91 motor in which the working member is of the rotating type as defined in subclass 58 of Class 91.

With respect to expansible chamber motors in which the working member has a reciprocating or oscillating motion to expand and contract the expansible chamber, Class 92 will take those patents in which no control of the motive fluid by a valving action is claimed. Thus, any claimed valving of motive fluid of an expansible chamber motor is sufficient to preclude classification in Class 92 even though the valving claimed may not be all of the valving necessary to cause the motor to operate in the intended manner. However, if a claim is for an expansible chamber motor driving a specifically claimed Class 92 device, then classification is in Class 92 regardless of the details of the expansible chamber motor recited.

## Cl. Def.

See Class 92 subclass 3+. For the classification of various subcombination features of Class 92 devices elsewhere classified see the class definition and appropriate notes in Class 92.

With regard to claim interpretation to determine whether valving is claimed to cause classification in Class 91, or is not claimed thus permitting classification in Class 92 the following criteria have been followed:

- (1) Claims which include a limitation such as "means for supplying fluid to the motor" or "means supplying fluid to the motor" are construed as requiring no more than the conduits or ports which supply the fluid and would, therefore, not be interpreted as including valving for Class 91.
- (2) Claims which include a limitation similar to that in (1) above, but with a further limitation which indicates a change in supply of working fluid such as --alternately, periodically, intermittently, pulsing, fluctuating, reversing flow, etc.--are construed as necessarily including more than a mere conduit or port and are excluded from Class 92. These patents would thus be classified on their claimed disclosure of what performs the noted change in the supply. Thus, a patent claiming "means (for) alternately supply motive fluid to the motor" would be classified in Class 91 if said means is disclosed as a valve.
- (3) A port in an expansible chamber wall which is disclosed as controlled by the working member as, for example, an exhaust port which is overrun by a piston, together with the working member constitutes valving for Class 91. If such a port is claimed classification is in Class 91 regardless of whether the claim sets forth that the working member controls the port.

(4) Note. RELATIONSHIP TO CLASS 60

The general line between Class 91 and Class 60 is that if subject matter relating to power production comprising more than an expansible chamber motor or more than a plurality of such motors is claimed, classification is in Class 60 if otherwise appropriate.

More specifically the line may be categorized as follows:

A. Plural or combined type motors

(1) The combination of a motor classifiable per se in Class 91 with a motor of another type (including a pulsator) i.e., one which per se would be classified in another motor class, is classified in Class 60. See Class 60 subclass 6+ and particularly subclasses 10.5, 14+ and 20+. However, the combination of a Class 91 type motor with a second motor which performs an ancillary function only of the Class 91 type motor (e.g., valve operating motor) and provides no power for external use is not excluded from Class 91 even if the second motor is of another type (e.g., electric motor).

(2) The combination of a plurality of Class 91 type motors, or a Class 91 type motor having a plurality of working members (e.g., pistons) is classified in Class 91. See the Search Class 60 note in subclass 170 of Class 91 for a further statement of this line.

B. Motive fluid source, modification or exhaust treatment

(1) Pumps.

The inclusion in a claim of a pump broadly which provides motive fluid for utilization by the Class 91 motor does not preclude classification in Class 91.

The following examples of terminology have been considered to be nominal inclusion of a pump and if so claimed would not preclude classification in Class 91:

- (a) a pump
- (b) a rotary pump
- (c) a motor driven pump
- (d) a motor driven rotary pump
- (e) an internal combustion engine having an intake manifold (as a source of vacuum)
- (f) a plurality of pumps arranged in parallel
- (g) a circuit comprising a sump, pump and motor

The following examples have been considered to be significant inclusion of a pump, and if so claimed would preclude classification in Class 91 and cause classification in Class 60, if otherwise appropriate:

(a) a pump which is characterized as to type, e.g., centrifugal, eduction, constant displacement, variable displacement, pulsator, etc., (however, see (b) in the preceding paragraph)

(b) a motor driven pump in which the motor is characterized as to type, e.g., turbine, electric motor, internal combustion engine (however, see (e) in the preceding paragraph)

(c) a pump which has any detail thereof recited as, for example, a "piston"

(d) a plurality of pumps in series

(e) a particular physical relation between a nominal pump, and (1) a motor supplied thereby, or (2) with a sump, reservoir or tank forming part of the circuit supplying the pump. For example, this particular physical relation may include their relation in space or mechanical interconnection means.

See particularly Class 60 subclasses 17+, 51+ and 57+.

## (2) Accumulators.

A motor having an expansible chamber in constant communication with an accumulator for pressurized motive fluid is not precluded from Class 91 regardless of the specificity with which the accumulator is recited, the accumulator in this case being considered to be merely a part of the expansible chamber.

Class 60 takes an accumulator combined with a Class 91 motor in which a control valve means is interposed between the accumulator and expansible chamber unless the accumulator is claimed so broadly as to amount to a mere conduit. See particularly Class 60 subclasses 51+ and 57+.

## (3) Internal Generation.

Class 60 takes those expansible chamber motors in which the motive fluid within an expansible chamber is heated or cooled, as, for example, by a fluid in heat exchange relation with the interior of the chamber. Such a fluid may be the same motive fluid used in the chamber either before or after it passes through the chamber. See Class 60 subclass 27+.

## (4) Heating, Superheating or External Generation.

An expansible chamber motor having a nominally claimed means to heat or superheat the motive fluid before introduction into the expansible chamber is not precluded from Class 91. For example, Class 91 takes a "boiler" combined with an expansible chamber motor while a "fire tube boiler" combined with a Class 91 motor would be classified in Class 60. See, for example, Class 60 subclass 104.

Class 91 does not take the combination of an expansible chamber motor with an explosive generation of motive fluid even if nominally claimed. See, for example, Class 60 subclass 26.1+.

## (5) Exhaust Treatment or Handling.

Class 60 takes combinations involving treatment of motive fluid after it leaves an expansible chamber where means is claimed to change some characteristic of the fluid. A condenser is an example of such a means, but the inclusion of a condenser in a claim by name only is not sufficient to preclude a patent from Class 91. See the notes to Class 60 subclasses 17, 18, 51+ and 57+ for the classification of specific means to create a pressure differential in motive fluid exhausting from a vacuum or suction type motor.

Class 60 also takes combinations involving handling of exhaust fluid from a fluid motor. This fluid is considered to be exhaust fluid for Class 60 after it leaves the last claimed valve means which could affect operation of the Class 91 motor. Handling is considered to necessarily include more than a mere pipe or chamber to conduct the exhaust fluid away. A valve for controlling a Class 91 motor, located in the exhaust line from the motor, designed to direct exhaust fluid to one or more of a number of exhaust passages is not exhaust fluid handling for Class 60. However, an exhaust fluid conductor having a number of ports therein merely for the purpose of dividing the exhaust stream is more than a mere chamber or pipe and is classified in Class 60. Claimed limitations to an elbow, support or other fitting which constitutes a mere part of the exhaust pipe will be ignored, but any significant relation of the pipe and motor will result in classification in the appropriate exhaust treatment subclass of Class 60. A particular physical relation or mechanical interconnection between a chamber or reservoir for receiving exhaust fluid from the motor and the motor has been considered exhaust handling for Class 60. See Class 60 subclass 64+.

## Cl. Def.

C. Pulsators

Class 60 takes pulsator systems in which a generally constant mass of confined motive fluid passes between pump and motor expansible chambers and returns to the pump by the same route or conduit. Class 60 also provides for such pulsator systems where additional fluid is added to the system whether the fluid is make-up fluid to replace leakage or pressurized motive fluid to operate the motor, unless the pressurized motive fluid is valved by a movable valve element which is mechanically connected to the pump working member so that movement of the working member will cause movement of the valve element. The latter combination is classified in Class 91. See the Search Class 60 note in subclass 6 of Class 91 for a further statement of this line.

It is to be noted that some pulsator systems which involve a generally constant mass of confined motive fluid include a valve such as a throttle between the pump and motor. The claiming of the motor and valve only in such a disclosed system is excluded from Class 91 in that the fluid does not exhaust to some place other than whence it came.

Search Class 60 subclasses 54.5+ and 62.5+ for pulsators and pulsator systems.

## II DEFINITION OF TERMS

Cylinder - A rigid external member which permanently surrounds the piston, the latter constituting a relatively moving wall for the expansible chamber, the other walls of which are formed by the cylinder, and the cylinder ordinarily including the abutment or reaction surface against which the motive fluid acts or the piston forming the abutment for the cylinder when the cylinder is movable and the piston fixed. However, the abutment or reaction surface for the piston need not necessarily be formed by the cylinder, but may be formed by a second relatively movable opposed piston within the cylinder. If the piston withdraws from the cylinder merely to control the motive fluid, the piston is still considered to be permanently surrounded by the cylinder.

Distributor - Means which comprises or includes a part which is movable relative to the working member of a cyclically operable motor to control a motive fluid port or passage in such a manner as to cyclically control inlet and/or exhaust flow of motive fluid to or from the motor. The distributor need not entirely cut off the motive fluid flow, but may cyclically control the amount of flow (i.e., throttling).

Motive Fluid - The fluid (expansible or inexpandible) which is introduced into or withdrawn from a working chamber of the motor to cause the working member to move. The term "motive fluid" applies to the fluid from the point of origin to the point of disposal. Fluid which is withdrawn from the motive fluid supply to perform some other motor function, such as motor valve operation, is still considered to be motive fluid even though said fluid never enters the working chamber of the motor. Atmospheric air which acts upon the working member of a vacuum motor is not considered to be motive fluid unless the atmospheric air is controlled in some manner, as by valving. In a vacuum motor the fluid which is evacuated from the working chamber is considered to be exhaust motive fluid and the atmospheric air, if controlled, is considered to be inlet motive fluid.

Non-Working Chamber - A chamber of the motor which expands and contracts incident to movement of the working member, and which is neither expanded nor contracted to do work by fluid supplied to or evacuated from said chamber.

Working Chamber - A chamber into which motive fluid is introduced or from which motive fluid is withdrawn (vacuum) to cause the working member to move to perform work, the chamber expanding or contracting incident to the movement of the working member. A chamber of a vacuum motor to which atmospheric air has free ingress and egress without any control thereof is not a working chamber. However, a chamber of a vacuum motor in which atmospheric air acts and some control is exercised over the atmospheric air is a working chamber.

Working Member - A movable wall of the expansible chamber to which motive fluid is applied or to which atmospheric air is applied in the case of vacuum motor, said wall moving as a result of the application of the motive fluid and in so moving doing work for utilization by means other than the motor or some part thereof. In a reciprocating motor this term is generic to both a moving piston and a moving cylinder. The working member is considered to include the movable wall to which motive fluid is applied as well as all parts which are rigid therewith (e.g., piston rod). However, a pair of separate

movable walls disposed in separate working chambers (i.e., chambers which are not in fluid communication during at least some part of the operation of the motor), even though rigidly connected together, are considered to be plural working members if the application of motive fluid thereto urges both walls in the same direction. A working member has a single working surface which surface may have two or more relatively movable faces so long as adjacent faces are always an extension of each other (e.g., flexible diaphragm or bellows).

See (3) Note of subclass 418 of Class 91 for definitions of terms applicable to subclass 418+ only.

### III SEARCH CLASS: (INCLUDES STATEMENTS OF THE LINE WITH OTHER CLASSES).

#### 60, Power Plants

See (4) Note above for the relationship of Class 91 and Class 60.

#### 73, Measuring and Testing

subclass 232+ for expansible chamber type volume or rate of flow meters. Class 73 includes expansible chamber meters combined with registering mechanism and meters incapable of general use as an expansible chamber motor. A meter is considered to be incapable of such general use if there is no disclosed means to take power therefrom for external use such as to a registering mechanism. Therefore, Class 91 takes an expansible chamber device disclosed as a meter having means to take power therefrom such as for an unclaimed registering mechanism.

#### 74, Machine Elements and Mechanisms

appropriate subclasses for machine elements and mechanisms, per se and in combination with a nominally claimed expansible chamber motor. In general gearing or linkage included as part of the power output means from an expansible chamber motor is considered to be basic subject matter of the motor and would not preclude classification in Class 91. Also see (2) Note, in subclass 55 of Class 91. For statement of the line between Class 74 and Class 92, see Section III of the class definition Class 92.

#### 92, Expansible Chamber Devices

See (3) Note above for the relationship of Class 91 and Class 92.

#### 103, Pumps

appropriate subclasses for expansible chamber devices usable either as a pump or motor. Many expansible chamber devices, particularly the rotary type, are capable of use either as a pump or a motor without modification, the only difference being whether pressure fluid is introduced, and mechanical power produced (motor) or mechanical power is introduced and pressure fluid produced (pump). The following criteria will determine original classification of a patent:

- (a) Where the disclosure is that the device can be used as a pump or motor, classification in Class 103, Pumps, will result if the device is claimed as a pump or alternatively as pump or motor, or generically as an expansible chamber device, for example. If such a device is claimed as a motor, classification will be in Class 91.
- (b) Where the device is solely disclosed as a pump, classification in Class 103 will result whether claimed generically or specifically.
- (c) Where the device is solely disclosed as a motor, classification in Class 91 will result whether claimed generically or specifically.
- (d) Where the device is disclosed and claimed generically, classification in Class 103 will result.

subclass 43+ for expansible chamber motor driven pumps. The claiming of the pump by name only or merely as a piston and cylinder is not sufficient to exclude a patent from Class 91, the pump or piston and cylinder being considered a nominal load or the equivalent of a cross-head and guide for the motor.

#### 123, Internal-Combustion Engines

The line between Class 91 and Class 123 is one of disclosure. Thus, any patent which has at least one embodiment of the invention which is disclosed as an internal combustion engine, and which has a claim specific to such embodiment, and in which the claim includes control of the motive fluid, is classified in Class 123 even though the motive fluid control is not necessarily limited to internal combustion operation.

## Cl. Def.

## 137, Fluid Handling

subclass 16+, for prime mover control. Class 91 is related to this portion of Class 137 as a species of the generic prime mover control provided for therein. Control of a prime mover which is specifically disclosed as a motor of the Class 91 type would, therefore, be classified in Class 91 whether the motor is claimed specifically or broadly. Class 137 takes those patents in which the prime mover is generically disclosed or of indeterminate type unless the fluid control thereof is responsive to position or extent of movement of the motor working member. For a generically disclosed fluid motor having fluid control in response to position or extent of movement see Class 253, Motors, Fluid, appropriate subclasses. A motor which is disclosed as having a reciprocating (including oscillating) output shaft will be considered to be a Class 91 motor even though no other detail of the motor is shown.

subclass 82+, for pressure modulating relays or followers for expansible chamber motors. The positive inclusion in a claim of the expansible chamber motor which is controlled by the pressure modulating relay or follower precludes classification in Class 137 and causes classification in Class 91. See, for example, subclasses 3, 47+ and 52 of Class 91.

subclasses 87+, 455+ and 561+ for self proportioning or correlating systems, line condition change responsive valves and multiple or multi-way valves for expansible chamber motors, respectively. The positive inclusion in a claim of the motor which is being controlled by the valve means precludes classification in Class 137. The inclusion in a claim of a cylinder in combination with a valve will not exclude a patent from Class 137 on the basis that a cylinder is the equivalent of a flow path being controlled by the valve. However, where a cylinder is claimed as having passages leading to or ports present in opposite ends thereof (as in a double acting motor) the patent is excluded from Class 137. Also see (2) Note in Section I above.

## 172, Earth Working

appropriate subclasses, and especially subclasses 2+, 464-466 and 491 for expansible chamber motor operated or adjusted implements and see the reference to Class 91 in the Search Class section of Class 172 for a statement of the line.

## 173, Tool Driving or Impacting, appropriate subclasses for an expansible chamber fluid motor in a claimed combination peculiar to tool driving, such as a tool drive means combined with a tool impacting, work cleansing, tool advancing or manipulating handle feature. See the class definition of Class 173 for a complete description of the subject matter provided for therein. Also see the reference to Class 91 in Section IV of the class definition of Class 173.

180, Motor Vehicles, subclass 53 for vehicles with power take-off means from the vehicle motor to a nominally claimed load.

## 230, Gas Pumps and Fans

appropriate subclasses for expansible chamber devices usable either as a pump or motor. Many expansible chamber devices, particularly the rotary type, are capable of use either as a pump or a motor without modification, the only difference being whether pressure fluid is introduced and mechanical power produced (motor) or mechanical power is introduced and pressure fluid produced (pump). The following criteria will determine original classification of a patent:

- (a) Where the disclosure is that the device can be used as a gas pump or motor, classification in Class 230, Gas Pumps and Fans, will result if the device is claimed as a pump or alternatively as pump or motor, or generically as an expansible chamber device, for example. If such a device is claimed as a motor, classification will be in Class 91.
- (b) Where the device is solely disclosed as a gas pump, classification in Class 230 will result whether claimed generically or specifically.
- (c) Where the device is solely disclosed as a motor, classification in Class 91 will result whether claimed generically or specifically.
- (d) Where the device is disclosed and claimed generically and utilizes gas classification in class 230 will result.

subclass 48+ for expansible chamber motor driven gas pumps. The claiming of the pump by name only or merely as a piston and cylinder is not sufficient to exclude a patent from Class 91, the pump or piston and cylinder being considered a nominal load or the equivalent of a cross-head and guide for the motor.

## 251, Valves and Valve Actuation

appropriate subclasses for valves and valve actuators for expansible chamber motors. The positive inclusion in a claim of the motor which is being controlled by the valve precludes classification in Class 251. The inclusion in a claim of a cylinder in combination with a valve will not exclude a patent from Class 251 on the basis that a cylinder is the equivalent of a flow path being controlled by the valve. Also see (2) Note in Section I above.

## 253, Motors, Fluid

Class 253 is the generic class for motors that are operated by a fluid or fluent material. Class 91 is related to Class 253 as a species thereof. Class 253 takes patents relating to motive fluid control of fluid motors where the motor is of indeterminate type and the control

is in response to position or extent of movement of the motor. It should be noted however, that Class 137 Fluid Handling, subclass 16+ takes patents relating to control of generically disclosed fluid motors in which the control is not in response to position or extent of movement of the motor. A motor which is disclosed as having a reciprocating (including oscillating) output shaft will be considered to be a Class 91 motor even though no other detail of the motor is shown.

Class 253 provides in various subclasses for motors having motor surfaces which are moved by impact of a jet of unconfined fluid thereon or are moved by a current or stream of confined fluid. Patents claiming a motor surface which forms a portion of a chamber which receives the fluid have been classified in Class 91 only if (1) the volume of the chamber changes significantly when the surface is moved by the fluid, and (2) if it is also clear from the disclosure that the surface is moved by the pressure of the fluid in the chamber rather than by any significant impact due to the velocity of the fluid. However, the mere fact that the inlet passage (providing ingress of fluid into the chamber) is directed towards the piston or moving surface of the expansible chamber would not exclude a patent from Class 91 in the absence of a claimed nozzle means disclosed as increasing the velocity component of energy in the fluid.

#### IV PLACEMENT OF PATENTS INVOLVING COMBINATION AND SUBCOMBINATION SUBCLASSES

In many instances the schedule of this class provides for a combination which requires a given subcombination, and elsewhere below provides for the subcombination.

The following rule has been followed as to the placement of the original patent, and as to cross-referencing, and should be followed in the future:

Where the combination subclass requires the same subcombination as is provided for in the subcombination subclass (i.e., subcombination defined with the same specificity in both subclasses) a patent disclosing the combination is placed as an original in, or under, the combination subclass regardless of whether the claims are directed to the combination or subcombination and is not cross-referenced to the subcombination subclass. A patent disclosing only the subcombination and claiming same is placed as an original in the subcombination subclass and is not cross-referenced to the combination subclass.

This rule is applicable only in instances where there is but a single subcombination subclass (i.e., no indented subclasses), but the combination subclass may be further subdivided into indented subclasses.

The prime feature of this situation is that the subcombination must, by definition, be of equal specificity in the two subclasses. A search for the subcombination, at least in the case where it is adapted to be used in the combination, of necessity involves all of the patents in the combination subclass. Under this system of placing the patents a complete search of the combination can be made in the combination subclass, and of the subcombination in both subclasses without the addition to the search files of the otherwise necessary cross-reference copies.

The subclasses involved in this combination-subcombination relationship have been indicated in the schedule by numbers in parenthesis, as explained in a paragraph after the class title.

Exemplary of this situation in the Class 91 schedule are subclasses 222 and 422. It is noted that subclass 222 and indented subclasses (223-229) provide for a distributor (valve) in the piston of a cyclically operable motor combination while subclass 422 requires only a valved piston subcombination. As between these subclasses any patent having a disclosed cyclically operable motor is placed as an original in subclass 222 or one of the indented subclasses regardless of whether the means which makes the motor cyclically operable is claimed and is not cross-referenced in subclass 422. A complete search for the subject matter provided for in subclass 422 of necessity involves all of the patents in subclass 222+.

#### V INDEX TO CLASSES NOTED IN (1) SECTIONS I-IV AND (2) THE SUBCLASSES OF THIS CLASS.

After each class listed below, the notation "See ----" refers to the sections of the class definition, and the subclasses of Class 91 in which there are references to the class listed.

60, Power Plants. See Sections I and III, and subclasses 4, 6, 40, 53, 54, 61, 170, 370, 388 and 433.

73, Measuring and Testing. See Section III, and subclasses 1, 56-58, 77, 81, 121, 142, 173, 175-177, 183, 185, 191, 210, 221, 222, 232 and 338.

## Sub. 1.

- 74, Machine Elements and Mechanisms. See Sections I and III, and subclasses 53, 59, 76, 86 and 331.
- 92, Expansible Chamber Devices. See Sections I and III, and subclasses 1, 4, 41, 46, 54, 55, 58, 169, 170, 175-177, 181, 183, 196, 198, 202, 210, 339 and 411.
- 103, Pumps. See Section III, and subclasses 56-58, 60, 61, 67, 75, 77, 81, 96, 109, 121, 126, 128, 129, 142-144, 150, 152 and 191.
- 123, Internal-Combustion Engines. See Section III, and subclasses 53, 54, 60, 81, 96, 109, 121, 142 and 245.
- 137, Fluid Handling. See Sections I and III, and subclasses 3, 170 and 221.
- 170, Motors, Fluid Current. See subclasses 151 and 170.
- 172, Earth Working. See Section III.
- 173, Tool Driving and Impacting. See Sections I and III, and subclasses 61 and 167.
- 180, Motor Vehicles. See Section III.
- 185, Motors, Spring, Weight and Animal Powered. See subclass 170.
- 192, Clutches and Power-Stop Control. See subclasses 41, 53, 59 and 76.
- 230, Gas Pumps and Fans. See Section III and subclasses 54, 56-58, 60, 61, 67, 75, 77, 152 and 245.
- 251, Valves and Valve Actuation. See Sections I and III, and subclass 37.
- 253, Motors, Fluid. See Section III, and subclass 151.

## Subclasses

1. Apparatus under the class definition having (1) signals, indicators, registers, recorders, or gauges for indicating a condition or the position of a motor part such as a piston, control member, valve, etc., such devices consisting of relatively movable, changeable or audible information giving parts, or (2) transparent viewing means whereby the motor operation or the condition of some part thereof may be observed.

(1) Note. For classification under part (1) of this definition there must be either an indicia or an audible or visual signal. Relative to indicia, there must be graduation or markings in the disclosure as claimed. Where it is indicated that the mere position of a motor part is indicative of a condition of the motor (e.g., valve handle position corresponds to motor position) classification under this definition does not result unless some cooperating indicia are included.

## SEARCH CLASS:

73, Measuring and Testing, subclass 232+ for expansible chamber type volume or rate of flow meters and see Section III of the class definition of this class for a general statement of the line between this class and Class 73.

92, Expansible Chamber Devices, subclass 5 for signals indicators or inspection windows for expansible chamber devices.

2. Apparatus under the class definition in which the motor has a working member which operates through a given cycle, i.e., from a given position through a revolution or reciprocation back to the starting position so as to be in condition to repeat the cycle, and having means for stopping or modifying the operation of the motor responsive to working member travel through a definite preselected number of cycles greater than one.

(1) Note. This definition does not include those motors which operate for a predetermined period of time and then are stopped or controlled in some way even though for a given speed it could be determined how many cycles or revolutions would be made in a given period of time.

## SEARCH THIS CLASS, SUBCLASS:

- 35+, for expansible chamber motors having means to start, stop or change the mode of operation thereof after passage of a predetermined time. See (1) Note above.
- 355+, for motors having control means to cut off the motor after the working member has made one complete cycle of operation.

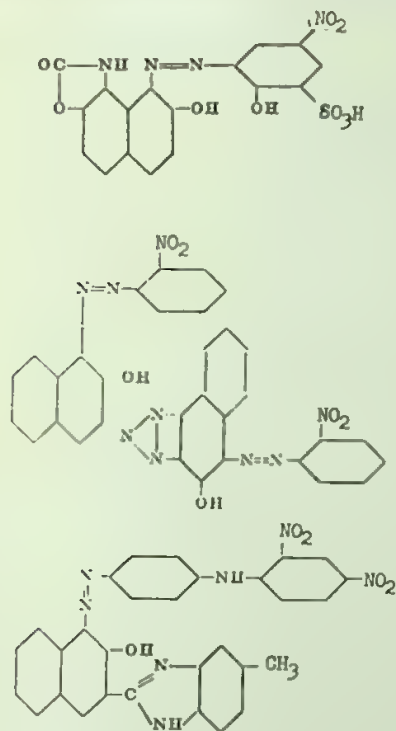
3. Apparatus under the class definition including means for providing a jet stream of motive fluid and a receiving orifice to receive all or a portion of the jet stream, motive fluid being conducted from the orifice to a working chamber of the motor to cause operation thereof, movement of the motor being controlled by varying the proportion of the jet stream which enters the orifice.

## SEARCH CLASS:

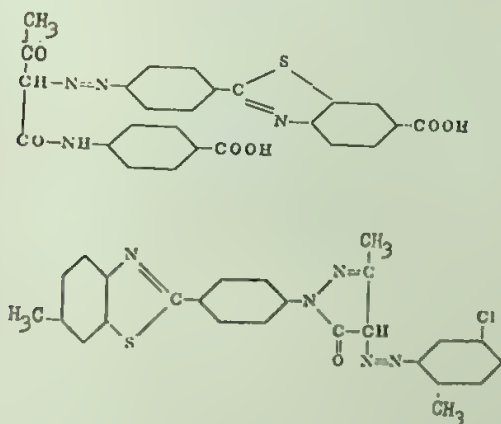
137, Fluid Handling, subclass 83 for jet control type pressure modulating relays or followers per se.

157. Compounds under subclass 152 which contain an azole nucleus.

Note. In this subclass are placed, for example, those compounds which contain the oxazole, diazole, and triazole nuclei. For example:

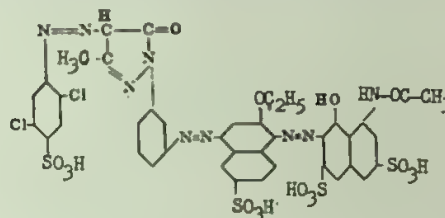


158. Compounds under subclass 157 which contain a thiazole nucleus. For example:



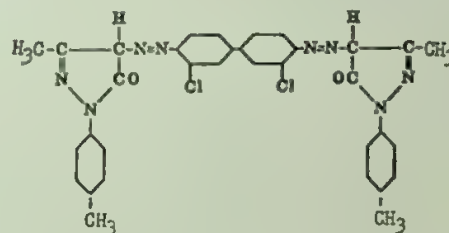
159. Compounds under subclass 157 which contain a pyrazole nucleus.

Note. In this subclass are placed, for example, those pyrazolone azo compounds which contain at least three azo groups. For example:



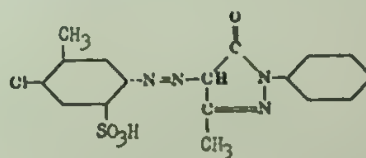
160. Compounds under subclass 159 which contain two azo groups.

161. Compounds under subclass 160 wherein the two azo groups are directly bonded to a diphenyl radical of the benzidine series. For example:



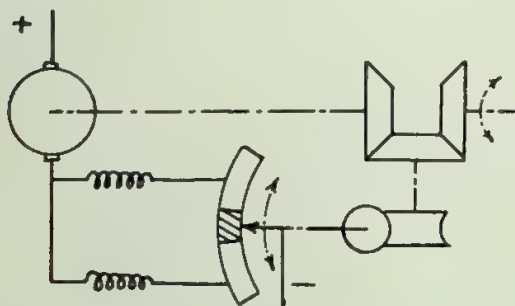
162. Compounds under subclass 159 which contain one azo group.

163. Compounds under subclass 162 wherein the radical of the diazo component is monocyclic. For example:



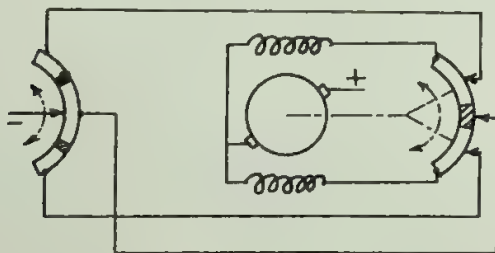
32. Subject matter under subclass 18 in which means are provided for causing the follow-up motor to return the transmitter to its normal or original position at which position the motor is not adapted to run or operate.

(1) Note. An example of a transmitter returned follow-up arrangement comprises a differential gearing wherein one element is driven by a control shaft, another element is driven by the controlled motor and the third element devices a circuit controlling means such as a switch. When the switch is in the neutral position, the arrangement is at rest. If the control shaft turns, the third element of the gearing drives the switch to an operating position to initiate operation of the motor to drive the second gearing element to drive the third gearing element to return the switch to neutral. The following is an illustrative example.



33. Subject matter under subclass 18 in which there are three or more conducting circuits extending from the transmitter or initiating controller to the motor or to a motor controller electrically located nearer the motor than is the transmitter.

(1) Note. The following is an illustrative example.



#### SEARCH THIS CLASS, SUBCLASS:

- 24, 25, 26, 27, for this subject matter where there are three or more such circuits in self-synchronous motor follow-up systems.  
30, for this subject matter where there are three or more circuits in "selsyn" or induction type self-balancing or self-adjusting network type follow-up motor systems.

34. Subject matter under the class definition in which there are two or more electric motors forming the ultimate load on the system of which one or more thereof are

1. Substantially structurally different than, or
2. Supplied by substantially different sources of electrical supply than, or
3. Controlled substantially differently than one or more others of the motors.

(1) Note. For example only, it is interpreted that

- (1) Motors differ structurally when they are different in size, capacity, structural details, etc.
- (2) Motors are supplied by different sources of supply when the sources differ (1) in kind or type (e.g., a.c. and d.c., generators and electrical converters, different types of electrical converters, different types of generators, etc.) or (2) when the sources differ in size or capacity, or in magnitude of an electrical characteristic thereof, such for example as frequency, voltage.
- (3) Motors are controlled differently when they are controlled at different times, in different degrees or magnitude, by different control means, by control means in different motor circuits, etc.

(2) Note. When the system of supply and control is not limited as above, that is, when the motors are controlled as a unit, classification will be in the subclasses with single motors.

(3) Note. The several motors must have a useful output severally and individually (i.e., they must be "work" motors). When a motor merely actuates a control element for controlling another motor, such motor is not a useful output or work motor such as is classified herein.

(4) Note. Plural motors implies the existence of two distinct motors. Two distinct motors may be encased in a common housing, be intricately interfitting, or mounted on a common base. However, each must have its distinct field structure and its distinct primary or armature structure, and each must be magnetically distinct, from the other. A motor element having a common field structure, a common field flux or a common path for the field flux, even though excited by separate windings fed from each armature and two separate armature structures, is not considered a plural motor device. Likewise, a common armature with separate windings supplied by different sources, but in which the fluxes traverse common parts or paths is not a plural motor device.

## *Sample Classification Order*

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### CLASSIFICATION ORDER No. 344 (Modified) December 14, 1962

The following changes in the classification of inventions are hereby directed to take effect immediately:

#### ESTABLISH CLASS

165 Heat Exchange (Division 32)  
(Classifiers: L. R. Frye, R. A. Hill, C. L. Pace, C. Sukalo)

Note: The subclass schedule and definitions of the above class will appear in Classification Bulletin No. 451.

#### IN THE MANUAL OF CLASSIFICATION

#### ABOLISH CLASS

257 Heat Exchange (Division 32)

#### CHANGE SUBCLASS POSITION

in Class 179, Telephony (Division 77), change the position of subclass 15.55 as follows:

#### SYSTEMS

15.55 Frequency range compression and/or expansion systems (to be coordinated with subclass 15)

#### CHANGE SUBCLASS TITLE

in Class 146, Vegetable and Meat Cutters and Comminutors (Division 5), change the title of subclass 71 to read:

71 Corncob splitter and/or disintegrator

#### ESTABLISH SUBCLASS

in Class 146, Vegetable and Meat Cutters and Comminutors (Division 5)  
(Classifier: W. A. Morse, Jr.)

#### CHANGES IN CLASSES ARRANGED BY DIVISIONS

under Division 32

Delete: 257 Heat Exchange

Insert: 165 Heat Exchange

#### CHANGES IN CLASSES ARRANGED IN ALPHABETICAL ORDER

Delete: 257 Heat Exchange..... 32

Insert: 165 Heat Exchange..... 32

## CHANGES IN CLASSES ARRANGED IN NUMERICAL ORDER

Delete: **165** No Class  
 Insert: **165** Heat Exchange..... 32  
 Delete: **257** Heat Exchange..... 32  
 Insert: **257** No Class

## PRINCIPAL DISPOSITION OF PATENTS FROM ABOLISHED SUBCLASSES

<i>Abolished</i>		<i>Disposition</i>		<i>Abolished</i>		<i>Disposition</i>	
<i>Class</i>	<i>Subclass</i>	<i>Class</i>	<i>Subclass</i>	<i>Class</i>	<i>Subclass</i>	<i>Class</i>	<i>Subclass</i>
<b>257</b>	<b>1</b>	<b>165</b>	95, 186	<b>257</b>	<b>102</b>	<b>165</b>	109, 120 +
	12, 13		46		103		109
	14		169		104		92 +
	15		74		105, 106		109
	16		52, 135 +		107		92 +
	17		75		108, 109		109
	17. 5		45		110		94
	18, 19		107		111		90 +
	20		75		112		87
	21		136, 169		113, 114		94
	22		75, 163		115, 116		86 +

## PRINCIPAL SOURCE OF PATENTS IN ESTABLISHED SUBCLASSES

<i>Established</i>		<i>Source</i>		<i>Established</i>		<i>Source</i>	
<i>Class</i>	<i>Subclass</i>	<i>Class</i>	<i>Subclass</i>	<i>Class</i>	<i>Subclass</i>	<i>Class</i>	<i>Subclass</i>
<b>146</b>	<b>70. 1</b>	<b>146</b>	70, 106 +	<b>165</b>	<b>63</b>	<b>257</b>	302
		<b>241</b>	185 +, Var.		64		303
<b>165</b>	<b>1</b>	<b>257</b>	<b>1</b>		65		304
	2		272		66		305
	3		273		67		137
	4		264		68		124, 240, 257
	5		265		69		137, 261
	6		266		70		245
	7		267		71		1, 219, 236
	8		268		72		240, 242
	9		269		73		25, 34, 191

## *Partial List of Pertinent Reading Material*

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### A. COMPREHENSIVE LIST OF ARTICLES IN THE JOURNAL OF THE PATENT OFFICE SOCIETY PERTAINING TO CLASSIFICATION, AS OF 1964

- Vol. 1, No. 3 Nov. 1918 (106-111) The need of a secondary patent classification based on industrial arts. W. L. THURBER.
- No. 5 Jan. 1919 (223) Letters on the classification of patents. W. L. THURBER AND S. J. TELLER.
- No. 7 Mar. 1919 (338-341) Art classification for Patent Office purposes. G. A. LOVETT.
- No. 8 April 1919 (383) Classification of patents made in examination divisions.
- Vol. 3, No. 4 Dec. 1920 (178-191) Explanation of patent classification and use of the Manual. W. A. KINNAN.
- Vol. 4, No. 3 Nov. 1921 (104) Method of classification of patents in examining division. J. T. NEWTON.
- Vol. 5, No. 6 Feb. 1923 (157) A loose-leaf manual of classification.
- Vol. 6, No. 5 Jan. 1924 (209) The Manual of Classification.
- No. 9 May 1924 (402) Classification Index—Use of catch titles.
- Vol. 9, No. 2 Oct. 1926 (68) An experiment in classification. D. H. SWEET
- Vol. 12, No. 4 April 1930 (170) Panoramic classification arrangement. V. E. WOODCOCK.
- Vol. 14, No. 6 June 1932 (532-537) Classification. L. BURGESS.
- No. 10 Oct. 1932 (745-762) The Patent Office Scientific Library. R. S. OULD.
- Vol. 15, No. 1 Jan. 1933 (3) Proper classification of patents is vital. J. ROSSMAN.
- No. 9 Sept. 1933 (688-692) Possible reorganization of Patent Office divisions and classes. A. E. MOORE.
- Vol. 16, No. 1 Jan. 1934 (3) Emergency funds for Patent Office classification work. J. ROSSMAN.
- No. 2 Feb. 1934 (178) Comment on Patent Office classification. E. S. PEARCE.
- No. 11 Nov. 1934 (867-874) A voice in the wilderness—Methods of classification. D. H. SWEET.
- Nov. 1934 (891-894) Classification of patents. C. H. KEEL.
- Vol. 17, No. 6 June 1935 (504-508) The American and German patent classifications. A. ACKERMANN.
- Vol. 18, No. 12 Dec. 1936 (864-874) Classification, a basic need. N. BLUFFESTONE.
- Vol. 20, No. 10 Oct. 1938 (815-830) Classification of inventive ideas. W. I. WYMAN.
- Vol. 24, No. 7 July 1942 (511-512) Field of search for synthetic rubber patents.

- Vol. 29, No. 4 April 1947 (241-261) Problems of classifying chemical patents. M. C. ROSA.
- Vol. 29, No. 6 June 1947 (409-430) Notes on the German classification of patents. N. BALL.
- No. 6 June 1947 (431-446) Explanatory Remarks on class 318. I. L. SRAGOW.
- No. 10 Oct. 1947 (733-448) Explanatory Remarks on class 322. I. L. SRAGOW.
- No. 11 Nov. 1947 (846) Unofficial classification. NUNN.
- Vol. 30, No. 2 Feb. 1948 (144-145) Classification Manual v. In re Hill. G. T. JOHANNESSEN.
- Vol. 31, No. 8 Aug. 1949 (592-603) Remarks Concerning class 343. J. E. LADY.
- No. 10 Oct. 1948 (787-789) Combination and subcombination—Division between-Classification of subcombinations. C. W. DAWSON.
- Vol. 40, No. 2 Feb. 1958 (86-109) Classification, Searching and Mechanization in the U.S. Patent Office. B. E. LANHAM AND J. LEIBOWITZ.
- Vol. 43, No. 5 May 1961 (307-316) The Search Before Research and Decision. H. F. CLESNER.
- No. 6 June 1961 (418-434) Classified Patent Search Files, A Proposed Base for Technical Information Centers. S. M. NEWMAN.

## B. GENERAL BACKGROUND MATERIAL

- (1) HERDMAN, M. M. Classification, an Introductory Manual. 2d ed. Chicago, American Library Association, 1947. 50 pages.
- (2) JEVONS, W. S. The Principles of Science. New York, Macmillan, 1874. (Book V, Chap. XXX, pp. 344-426).
- (3) MANN, M. Introduction to Cataloging and Classification of Books. Chicago, American Library Association, 1930. 424 pages.
- (4) MILL, J. S. A System of Logic. 8th ed. London, Longman Green, 1870. (Book IV, Chaps. VII and VIII, pp. 465-479).
- (5) RICHARDSON, E. C. Classification—Theoretical and Practical. 3d ed. New York, H. W. Wilson, 1930. 228 pages.
- (6) SAYERS, W. C. B. An Introduction to Library Classification. 7th ed. London, Grafton, 1946. 294 pages.
- (7) SAYERS, W. C. B. A Manual of Classification. 3d ed. London, Grafton, 1955. 346 pages.
- (8) U.S. Congress. Senate. 88th Cong., 1st Sess. Staff Report of the Subcommittee on Patents, Trademarks, and Copyrights. U.S. Patent Office Research and Development Program. Washington, G.P.O., 1963. 55 pages. (Appendix 7 lists most of the papers issued by R&D pertaining to mechanized search and retrieval.)

Note: Bibliographic material available in Patent Office Scientific Library.

APPENDIX V

*Figures Relating to the Historical Preface*



# US. PATENT OFFICE CLASSIFICATION 1838

- Class 1 —AGRICULTURE, INCLUDING INSTRUMENTS AND OPERATIONS
- Class 2 —ARTS POLITE, FINE, AND ORNAMENTAL  
Including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.
- Class 3 —CALORIFIC  
Comprising lamps, fire-places, stoves, grates, room-heaters, cooking apparatus, fuel, &c.
- Class 4 —CHEMICAL MANUFACTURES, PROCESSES AND COMPOUNDS  
Including medicine, dyeing, color-making, distilling, mortars, cements, &c.
- Class 5 —CIVIL ENGINEERING  
Comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements
- Class 6 —FIBROUS AND TEXTILE SUBSTANCES  
Including machines for preparing and manufacturing the fibres of wool, cotton, silk, fur, &c.
- Class 7 —FIRE-ARMS AND IMPLEMENTS OF WAR, AND PARTS THEREOF  
Including manufacture of shot and gunpowder
- Class 8 —GRINDING MILLS AND MILL-GEARING  
Containing grain mills, mechanical movements, horse-power, &c.
- Class 9 —HYDRAULICS AND PNEUMATICS  
Including water-wheels, wind-mills, and other implements operated by air or water, or employed in the raising and delivery of fluids
- Class 10—HOUSEHOLD FURNITURE  
Including domestic implements, washing machines, soap and candle making, bread and cracker machines, feather dressing, &c.
- Class 11—LAND CONVEYANCE  
Comprising carriages, cars, and other vehicles, used on roads, and parts thereof
- Class 12—LEATHER  
Including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.
- Class 13—LEVER AND SCREW POWER  
Including presses for packing, expressing balances, windlasses, cranes, jacks, and other mechanical contrivances for raising weight, &c.
- Class 14—MATHEMATICAL, PHILOSOPHICAL, AND OPTICAL INSTRUMENTS  
Including clocks, chronometers, &c.
- Class 15—MANUFACTURE OF METALS AND INSTRUMENTS THEREFOR  
Including furnaces, implements for casting, nail and screw machines, hardware, safes, cutlery, &c.
- Class 16—NAVIGATION AND MARITIME IMPLEMENTS  
Comprising all vessels for conveyance on water, their construction, rigging, and propulsion; implements for fishing; diving-dresses, life-preservers, &c.
- Class 17—STEAM AND GAS ENGINES  
Including boilers and furnaces therefor, and parts thereof
- Class 18—STONE AND CLAY  
Including stone dressing, clay moulding and burning, mortar machines, &c.
- Class 19—SURGICAL INSTRUMENTS  
Including trusses, dental instruments, bathing apparatus, &c.
- Class 20—WEARING APPAREL  
Including instruments for manufacturing articles for the toilet, &c.
- Class 21—WOOD, MACHINES, AND TOOLS FOR MANUFACTURING  
Including sawing, planing, mortising, shingle, and stave, carpenters' and coopers' implements, buildings, roofs, &c.
- Class 22—MISCELLANEOUS

(There was no compendium of class titles and the above list is compiled from the titles and subheadings of the report of the Secretary of State to Congress dated Jan. 1, 1839.)

FIGURE 1.

## SYNOPSIS.

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FIGURE 2.—From 1857 "Subject-Matter Index of Patents of Invention" published by the British Patent Office.

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FIG. 3.—From 1872 "Classified Index of Subjects of Invention" published by the U.S. Patent Office.

# DIVISION XVI.

EXAMINER FREEMAN.

## Class 36.—Electricity.

Class 36.—ELECTRICITY. (XVI.)  
Sub-classes.

1. Alarms—	14. Connectors.	34. Meters.	51. Multiplex,
2. Burglar.	15. Dental instruments.	35. Morse registers.	52. Perforating,
3. Annunciators.	16. Electric heaters.	36. Motors.	54. Printing,
Applications—	Electric lights—	39. Recorders.	55. Quadruplex,
4. General.	17. Arc,	40. Regulators.	56. Railway-car,
7. Tools and machines.	18. Incandescent,	41. Relays and sounders.	Telephonic telegraphs—
Batteries—	19. Systems and appliances.	42. Repeaters.	57. Calls,
8. Galvanic,	21. Electro-magnets.	43. Rheostats.	58. Details,
72. Secondary,	23. Friction-generators.	71. Switches.	59. Electric,
73. Thermal.	25. Incrustation.	45. Telegraphs—	60. Magnetic,
7. Bells.	26. Indicators.	46. Automatic,	61. Mechanical,
8. Boat-steering.	27. Induction-coils.	47. Dial.	62. Radiophones,
9. Car-brakes.	29. Keys.	48. Duplex,	63. Reed,
10. Circuit-closers.	30. Lightning-arresters.	49. Dynamo,	64. Systems.
12. Condensers.	33. Magneto-electric.	50. Fire,	69. Transmitters.

NOTE.—Sub-classes 13, Conductors: 28, Insulators: 31, Lightningrods, and 70, Underground lines, will be found in Division III.

FIGURE 4a.—From the Jan. 3, 1882, "Supplement to the Official Gazette of the U.S. Patent Office."

## ELECTRICITY—CONTINUED.

- |  |   |
|--|---|
| <p>56. Telegraphs. Railway-car—<br/>Devices for telegraphing upon railway-trains. (See, also, Sub-class 32, Electric railway-signals, Class 104, Division IV.)</p> <p>57. Telephonic telegraphs. Calls—<br/>Including devices at telephone-stations for calling the person with whom it is desired to communicate. (See, also, Bells and Telephonic systems.)</p> <p>58. Telephonic telegraphs. Details—<br/>Including elements of all kinds of telephonic instruments.</p> <p>59. Telephonic telegraphs. Electric—<br/>Including devices for transmitting and reproducing sound by varying the resistance in electric currents.</p> <p>60. Telephonic telegraphs. Magnetic—<br/>Including devices for transmitting and reproducing sound by means of magnetical-induced currents.</p> | <p>61. Telephonic telegraphs. Mechanical—<br/>Including devices for transmitting and reproducing sound by means of mechanical vibrations.</p> <p>62. Telephonic telegraphs. Radiophones—<br/>Including devices for transmitting and reproducing sound by means of radiant energy.</p> <p>63. Telephonic telegraphs. Reed—<br/>Including devices for transmitting and reproducing sound by means of vibrating tongues.</p> <p>64. Telephonic telegraphs. Systems—<br/>Including circuits and apparatus for enabling and facilitating telephonic intercommunication between stations. (See, also, Annunciators and Telephonic telegraph-calls.)</p> <p>69. Transmitters—<br/>Mechanical devices for sending predetermined code-signals by unskilled operator.</p> |
|--|---|

The following sub-classes of Electricity have been distributed to other divisions, and will be found as indicated below:

- |  |   |
|--|---|
| <p><b>Clocks—</b><br/>Devices for actuating, controlling, and synchronizing.<br/>See Sub-class 28, Electric clocks, Class 58, Division XXIII.</p> <p><b>Conductors—</b><br/>Including cables, wires, and means for making and insulating the same; also, special constructions of cables for preventing induction. (See, also, Telegraphs and Lightning-rods, and Underground lines, Part of Class 36, Division III.)<br/>See Sub-class 13, Part of Class 36, Division III.</p> <p><b>Electrolysis—</b><br/>Electric decomposition and deposition.<br/>See Class 75, Metallurgy, Division III, and Class 96, Coating with Metal, Division VI.</p> <p><b>Exploding—</b><br/>Devices for igniting explosive charges.<br/>See Class 102, Projectiles, Division XXII.</p> <p><b>Gas-lighting—</b><br/>Devices for turning on and off, and igniting gas.<br/>See Sub-classes 48, Electric lighting devices, and 49, Portable electric lighting devices, Class 67, Division XIX.</p> <p><b>Insulators—</b><br/>Insulating bearing-points for line-wires. (See, also, Lightning-rods, Part of Class 36, Division III.)<br/>See Sub-class 28, Part of Class 36, Division III.</p> <p><b>Lightning-rods—</b><br/>Devices for protecting structures from lightning. (See, also, Insulators, Part of Class 36, Division III.)<br/>See Sub-class 31, Part of Class 36, Division III.</p> <p><b>Magnetic locks—</b><br/>Application of magnets to mechanical locks.<br/>See Class 70, Locks and Latches, Division XX.</p> | <p><b>Music-playing—</b><br/>Applications of electricity to musical instruments.<br/>See Class 84, Music, Division II.</p> <p><b>Railway-signals—</b><br/>Systems and apparatus for indicating conditions and relations of the way and trains.<br/>See Railway-car telegraphs, and Sub-class 32, Electric railway-signals, Class 104, Division IV.</p> <p><b>Separators—</b><br/>Electric and magnetic separators of heterogeneous matter.<br/>See Sub-class 55, Electric separators, Class 83, Division XXV.</p> <p><b>Telegraph-poles—</b><br/>Posts for supporting aerial electric lines. (See, also, Insulators, Part of Class 36, Division III.)<br/>See Sub-class 2, Fence-posts, Class 39, Division II.</p> <p><b>Therapeutics. Baths—</b><br/>Applications of electricity to baths and bath furniture for curative purposes.<br/>See Sub-class 30, Baths, Class 128, Division XX.</p> <p><b>Therapeutics. Body-wear—</b><br/>Galvanic devices to be applied to the body for curative purposes.<br/>See Sub-class 31, Body-wear, Class 128, Division XX.</p> <p><b>Therapeutics. Electrodes—</b><br/>Circuit terminals for applying electricity to the body.<br/>See Sub-class 29, Electric apparatus, Class 128, Division XX.</p> <p><b>Thermostats—</b><br/>Devices for controlling circuits by changes in temperature.<br/>(See, also, Alarms, Electric lights, Fire-telegraphs, indicators.)<br/>See Sub-class 65, Thermostats, Class 73, Division XXIII.</p> <p><b>Underground lines—</b><br/>Conduits and conductors for subterranean lines.<br/>See Sub-class 70, Part of Class 36, Division III.</p> |
|--|---|

FIGURE 4b.—Excerpt from "Explanatory Notes" for Class 36 of figure 4a appearing in Jan. 3, 1882 Supplement.



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